S. Hrg. 99-657

NUCLEAR FACILITY STANDARDIZATION ACT OF 1986

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

NINETY-NINTH CONGRESS

SECOND SESSION

ON

S. 2073

A BILL TO ENCOURAGE THE STANDARDIZATION OF NUCLEAR POWERPLANTS, TO IMPROVE THE NUCLEAR LICENSING AND REGULATORY PROCESS, TO AMEND THE ATOMIC ENERGY ACT OF 1954, AND FOR OTHER PURPOSES

APRIL 22, 1986

Printed for the use of the
Committee on Energy and Natural Resources

U.S. GOVERNMENT PRINTING OFFICE
60-370 O WASHINGTON : 1986

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

S311-43

COMMITTEE ON ENERGY AND NATURAL RESOURCES

JAMES A. McCLURE, Idaho, *Chairman*

MARK O. HATFIELD, Oregon
LOWELL P. WEICKER, Jr., Connecticut
PETE V. DOMENICI, New Mexico
MALCOLM WALLOP, Wyoming
JOHN W. WARNER, Virginia
FRANK H. MURKOWSKI, Alaska
DON NICKLES, Oklahoma
CHIC HECHT, Nevada
DANIEL J. EVANS, Washington

J. BENNETT JOHNSTON, Louisiana
DALE BUMPERS, Arkansas
WENDELL H. FORD, Kentucky
HOWARD M. METZENBAUM, Ohio
JOHN MELCHER, Montana
BILL BRADLEY, New Jersey
JEFF BINGAMAN, New Mexico
JOHN D. ROCKEFELLER IV, West Virginia

Frank M. Cushing, *Staff Director*
Gary G. Ellsworth, *Chief Counsel*
D. Michael Harvey, *Chief Counsel for the Minority*

CONTENTS

Page

S. 2073 4

STATEMENTS

Anderson, Dr. John A., executive director, the Electricity Consumers Resource Council 286

Asselstine, James K., Commissioner, Nuclear Regulatory Commission 62

Bernthal, Frederick M., Commissioner, Nuclear Regulatory Commission 68

Brewer, Dr. Shelby T., senior vice president, Combustion Engineering, Inc 163

Bumpers, Hon. Dale, a U.S. Senator from the State of Arkansas 2

Connolly, Susan L., manager, Energy and Natural Resources Policy, Chamber of Commerce of the United States 255

Faden, Michael E., legislative counsel, Union of Concerned Scientists 269

Friend, Howard B., vice president, Bechtel Power Corp 137

Hecht, Hon. Chic, a U.S. Senator from the State of Nevada 22

Herrington, Hon. John S., Secretary of Energy 22

McClure, Hon. James A., a U.S. Senator from the State of Idaho 1

Moore, James S., vice president and general manager, power systems business unit, Westinghouse Electric Corp 198

Palladino, Hon. Nunzio J., Chairman, Nuclear Regulatory Commission, accompanied by Thomas M. Roberts, Frederick M. Bernthal, and Lando W. Zech, Jr., Commissioners 48

Priory, Richard P., vice president, design engineering, Duke Power Co 111

Siebert, H. Richard, Jr., vice president, resources and technology, National Association of Manufacturers 262

Smith, Sherwood H., Jr., chairman, president and chief executive officer, Carolina Power & Light Co 152

Stone & Webster Engineering Corp 92

Turley, Keith L., chairman of the board and chief executive officer, Arizona Public Service Co 99

Wilkins, Dr. Daniel R., general manager, advanced boiling water reactor program, General Electric Co 224

Zech, Lando W., Jr., Commissioner, Nuclear Regulatory Commission 67

APPENDIX

Responses to additional committee questions 315

NUCLEAR FACILITY STANDARDIZATION ACT OF 1986

TUESDAY, APRIL 22, 1986

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 10:10 a.m., in room SD-366, Dirksen Senate Office Building, Hon. James A. McClure, chairman, presiding.

Present: Senators McClure, Domenici, Warner, Murkowski, Hecht, Evans, Bumpers, and Ford.

Also present: Marilyn Meigs, professional staff member; and Benjamin S. Cooper, professional staff member for the minority.

OPENING STATEMENT OF HON. JAMES A. McCLURE, A U.S. SENATOR FROM THE STATE OF IDAHO

The CHAIRMAN. The committee will come to order. Today we will be receiving testimony from the Department of Energy, the NRC, and a number of public witnesses on S. 2073, the Nuclear Facility Standardization Act of 1986. This bill, drafted by the Department of Energy, is designed to encourage the standardization of nuclear powerplants and to improve the nuclear licensing process.

Most of us, I think, are familiar with the often-repeated fact that not a single nuclear powerplant has been ordered in this country since 1978. Actually, a closer look at the data paints an even bleaker picture, which is that there has not been a single nuclear powerplant ordered and completed since 1974. In other words, those plants that were ordered after 1974 were either canceled or abandoned.

This is truly unbelievable, considering the fact that the United States introduced the light water reactor technology to the world, and the United States now has the largest number of operating reactors of any nation in the world, 100 reactors as of this year.

Despite this impressive domestic track record, it is apparent that in this country further growth of nuclear power is now stagnated. In light of this situation, it is my firm belief that action must be taken to change the conditions that have removed nuclear power as a major source of our future energy supplies.

I cannot imagine that we would resign ourselves to the possibility that this country would permanently abandon nuclear power, with its substantial, long-term economic and environmental benefits. Likewise, given our commitment to conservation I cannot imagine that we will choose to continue to rely so heavily on the burning of coal and other fossil fuels simply to make steam when these fuels serve so many other beneficial uses for which there is no alternative feedstock.

I would hope that we could avoid the possibility that hundreds of years from now our descendants will look back and refer to us as the recklessly wasteful society, likening us to those who years ago shamelessly killed whales for lamp oil.

In my judgment, it would be foolish for us to forfeit the nuclear option in this country, especially considering that nuclear power has fared so well in other countries, particularly France and Japan. Even Russia relies heavily on nuclear power, despite the fact that Russia has an abundance of fossil energy resources.

Something has gone seriously wrong with our domestic nuclear industry, as more than one study will point out, studies such as the Forbes article, "Nuclear Follies," the Edison Electric Institute Report on Nuclear Power, Booz-Allen & Hamilton's recent analysis of the nuclear industry, and a recent article in Scientific American. All of these analyses point to many problems plaguing the domestic nuclear industry; some financial, some managerial, some institutional.

It is enlightening to compare the construction times and costs of our most recently completed nuclear plants to the record in France. The last half dozen plants completed in the United States took anywhere from 11 to 18 years to construct at a cost of over $2,500 per installed kilowatt. French nuclear powerplants are built in half the time at half the cost.

Clearly, one of the major causes of cost overruns and construction delays is the present nuclear licensing process. It is an area that is ripe for reform. We simply and literally cannot afford to proceed on our present path of customized plants and ad hoc regulations.

We need stability, uniformity, and predictability in the nuclear plant construction and licensing process. Changes are needed now in order to assure that we retain the nuclear option in this country. The Congress has an opportunity and an obligation to take a hard look at the nuclear licensing process and to enact into law the reforms that are necessary.

The testimony we receive today will set the stage for the passage of nuclear licensing reform legislation which could very well occur during this session of the Congress. The timing is right. There is increasing interest within the Congress, and there is general agreement on the types of changes that are needed.

[A prepared statement of Senator Bumpers and the text of S. 2073 follow:]

STATEMENT OF HON. DALE BUMPERS, A U.S. SENATOR FROM THE STATE OF ARKANSAS

Mr. Chairman, I am looking forward to hearing the testimony of the witnesses on this proposal for reforming the llicensing process for nuclear power plants. The utility industry and utility ratepayers have been burdened with excessive cost increase associated with the construction of many operating nuclear plants, as well as the costs of plants which have been cancelled or deferred. The project I am most painfully familiar with—Grand Gulf I—cost $3.424 billion to construct. This figure represents a $2.570 billion increase over the original cost estimate of $854 million. I am interested in hearing exactly how the reform proposal before us will prevent similar fiascos from occuring in the future.

I am also of the opinion that health and safety considerations must be paramount in the NRC licensing process. The current system is not conducive to the early identification and resolution of the technical safety issues which must be addressed in the licensing of nuclear reactors. It makes sense to resolve these safety issues through the development and approval of detailed standardized designs. However, I would be cautious about limiting the NRC's ability to correct, and the public's ability to point out, mistakes in these designs or modifications which significantly improve safety, at any point in the licensing process.

I look forward to hearing from the witnesses on these issues.

II

99TH CONGRESS
2D SESSION

S. 2073

To encourage the standardization of nuclear powerplants, to improve the nuclear licensing and regulatory process, to amend the Atomic Energy Act of 1954, and for other purposes.

IN THE SENATE OF THE UNITED STATES

FEBRUARY 18 (legislative day, FEBRUARY 17), 1986

Mr. MCCLURE (by request) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

---

A BILL

To encourage the standardization of nuclear powerplants, to improve the nuclear licensing and regulatory process, to amend the Atomic Energy Act of 1954, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Nuclear Facility Standardization Act of 1986".

FINDINGS AND PURPOSES

SEC. 2. (a) The Congress, recognizing that an effective and efficient licensing and regulatory process, for siting, construction, and operation of nuclear powerplants, which meets safety and environmental criteria is in the national interest, finds and declares that—

(1) interstate commerce is substantially affected by the siting, construction, and operation of nuclear powerplants;

(2) opportunity for meaningful public participation in the siting and licensing of nuclear powerplants should be assured;

(3) there is a need to encourage the development and use of standardized nuclear powerplant designs because (A) these designs would benefit public health and safety by concentrating the resources of designers, engineers, and vendors on particular designs, by stimulating standardized programs of construction practice and quality assurance, by improving the training of personnel, and by fostering more effective maintenance and improved operations; and (B) the use of these designs would permit a more effective and efficient licensing and inspection process;

(4) the licensing process will be facilitated by selecting and approving a site for a nuclear powerplant in advance of a commitment to construct a facility at that site;

(5) the licensing and regulatory process will be facilitated if licensing decisions are made as early as pos-

sible in the process and if issues resolved in Nuclear Regulatory Commission proceedings are not reconsidered in the absence of a showing required by this Act and the regulations of the Nuclear Regulatory Commission;

(6) consistent with the adequate protection of the public health and safety and the common defense and security, the regulatory process should provide greater stability in licensing standards and criteria for approved designs of nuclear powerplants;

(7) consistent with the paramount responsibility of the Nuclear Regulatory Commission to protect the public health and safety, and recognizing that the elimination of all risk is an unattainable goal for any energy source, it is appropriate and in the public interest for the Nuclear Regulatory Commission to consider the economic consequences of its regulatory practices, including the cost of safety requirements; and

(8) the Nuclear Regulatory Commission should adopt regulations setting forth criteria to govern all additions, deletions, and modifications to its regulatory requirements; these regulations should require a systematic, centralized, and documented review of the concerns that give rise to the proposed change, the improvement in safety that would result from adoption of

the proposed change, estimates of costs or other impacts on potentially affected licensees and the public, taking into account, if facility specific, the remaining life of the facility, and such other matters as the Commission determines to be necessary.

(b) The purposes of this Act are—

(1) to facilitate the development and use of standardized designs and the use of preapproved sites for nuclear powerplants;

(2) to provide for the issuance of a license to construct and operate a nuclear powerplant under conditions that enhance the protection of the public health and safety and are in accord with the common defense and security; and

(3) to improve the stability of licensing standards and criteria for nuclear powerplants and prior Commission licensing approvals.

TITLE I—LICENSING AND REGULATORY REFORM

APPROVAL OF STANDARDIZED DESIGNS

SEC. 101. The Atomic Energy Act of 1954 is amended by adding after section 191 (42 U.S.C. 2241) a new section 193 to read as follows:

"SEC. 193. APPROVAL OF STANDARDIZED DESIGNS.—

"a. The Commission shall establish procedures to permit the approval of standardized designs for a production or utilization facility to be licensed by the Commission and the approval of designs for any major subsystem of such a facility that represents a discrete element of the facility, as defined by the Commission, upon application by any person, after providing an opportunity for public hearing under section 189 of this Act, notwithstanding the fact that an application for a construction permit or construction and operating license for the facility has not been filed.

"b. Notwithstanding section 161 w. of this Act or the Independent Offices Appropriation Act of 1952, the Commission shall not require an application filing or issuance fee for an application for approval or for an amendment or renewal of an approval under this section. The Commission may allocate the costs that would otherwise have been defrayed by fees required of applicants under this section among applicants for permits or licenses who propose to use the approved design. If there is no application for a construction permit or a construction and operating license within ten years from the initial date of issuance of the approval, then the holder of the design approval shall pay the filing and issuance fees at the end of the ten year period.

"c. (1) After considering the information submitted in the application, and after providing an opportunity for public hearing under section 189 of this Act, the Commission shall issue an approval under this section if it determines that the design will comply with this Act, the rules and regulations of the Commission, and will not be inimical to the common defense and security or to the health and safety of the public.

"(2) Subject to section 187 of this Act, a design approval may be amended or modified in a design amendment proceeding. In a design amendment proceeding, the Commission shall not admit an issue that has been considered and decided in the design approval proceeding or an earlier design amendment proceeding unless the Commission determines that there is a material issue in dispute that cannot be resolved with sufficient accuracy except in a hearing and—

"(A) the issue could not have been considered and decided in a proceeding for the issuance, modification, or amendment of a design approval; or

"(B) a showing has been made that there is a nonconformance with the design approval that could materially and adversely affect the safe operation of a facility using the design.

"(3) A change to the design approval required by the Commission shall not apply to a construction permit or construction and operating license incorporating the design approval unless (A) the licensee requests the change, or (B) the requirements of section 187 of this Act are satisfied with respect to the change.

"d. (1) An approval issued by the Commission under this section may be incorporated by reference in, and shall be conclusive with respect to, an application for a construction permit or a construction and operating license if the application meets the conditions of the approval and is filed within a period of ten years from the date of issuance or renewal of the approval.

"(2)(A) Not less than twelve nor more than eighteen months prior to the expiration of the ten-year period provided under paragraph (1), the holder of the design approval may apply for a renewal of the approval. Upon review, the Commission may renew the approval for additional ten-year periods from the date of renewal.

"(B) Upon application for renewal of an approval issued under subsection c. of this section, the Commission shall renew the approval unless it finds, based on significant new information relevant to the design, that the design will not comply with this Act or the Commission's rules and regulations for protection of the public health and safety and the common defense and security.

"e. (1) The Commission shall approve an amendment to a design approval issued under this section upon application by the holder of the design approval if the Commission determines that the amendment will comply with this Act and the Commission's regulations.

"(2) An amendment approved by the Commission under paragraph (1) shall apply to an application for a construction permit or construction and operating license incorporating the design approval for which the amendment has been granted that is filed after the effective date of the amendment.

"(3) An amendment approved by the Commission under paragraph (1) shall not apply to an application for a construction permit or construction and operating license incorporating the design approval for which the amendment has been granted that is filed before the effective date of the amendment unless (A) the applicant requests that the amendment apply to the application, or (B) the requirements of section 187 are satisfied with respect to the amendment.

"f. The holder of a permit, license, or approval may deviate from any aspect of the permit, license, or approval, without prior Commission approval unless the deviation involves a change in technical specifications incorporated in the permit, license, or approval or an unreviewed safety question. A deviation that involves changes to technical specifications or unreviewed safety problems shall be proposed to the Commission as an amendment to the permit, license, or approval.

"g. A final Commission determination on an application filed under sections 193 a. or d. of this Act is a final order of the Commission for purposes of section 189 b. of this Act.".

EARLY SITE APPROVAL

SEC. 102. The Atomic Energy Act of 1954 is amended by adding after section 193, as added by this Act, a new section 194 to read as follows:

"SEC. 194. EARLY SITE APPROVAL.—

"a. The Commission shall establish procedures to issue a site permit for approval of a site for one or more production or utilization facilities upon the application of any person, notwithstanding the fact that an application for a construction permit or a construction and operating license for the facility or facilities has not been filed.

"b. (1) After considering all information submitted by an applicant, and after providing the opportunity for a public hearing under section 189 of this Act, the Commission shall issue a site permit subject to conditions that it considers appropriate if it determines that the proposed site is suitable for the construction and operation of the facility or facilities described in the application and that use of the proposed site will not be inimical to the common defense and security or to the health and safety of the public.

"(2) In a subsequent Commission proceeding involving use of a site for which a site permit has been granted under this section, the Commission shall not admit an issue that has been considered and decided in the site permit proceeding unless the Commission determines that there is a material issue in dispute that cannot be resolved with sufficient accuracy except in a hearing and—

"(A) the issue could not have been considered and decided in a proceeding for the issuance, modification, or amendment of a site permit; or

"(B) a showing has been made that there is a nonconformance with the site permit that could materially and adversely affect the safe operation of a facility at the site.

"(3) A final Commission determination on an application filed under this section is a final order of the Commission for the purposes of section 189 b. of this Act.

"c. (1) A site permit issued under this section may be incorporated by reference in, and shall be conclusive with respect to, an application for a construction permit or a construction and operating license if the application meets the conditions of the site permit and is filed within ten years from the date of issuance or renewal of the site permit.

"(2)(A) Not less than twelve nor more than eighteen months before the expiration of the ten-year period, a site permit holder may apply for a renewal of the site permit. Upon review, the Commission may renew a site permit for additional ten-year periods from the date of renewal.

"(B) Upon application for renewal of a site permit, the Commission shall renew the site permit unless it finds, based on significant new information that the site will not comply with this Act or the Commission's rules and regulations for protection of the public health and safety and the common defense and security.

"d. Approval of a site under this section does not preclude its approval for use as a site for an alternate or modified type of energy facility or for any other purpose.

"e. The Commission may issue a site permit with respect to limited aspects of the suitability of the site for its intended purpose, under rules and regulations the Commission considers appropriate.".

CONSTRUCTION PERMITS, OPERATING LICENSES, AND CONSTRUCTION AND OPERATING LICENSES

Sec. 103. Section 185 of the Atomic Energy Act of 1954 (42 U.S.C. 2235) and its catchline are amended to read as follows:

"Sec. 185. Construction Permits, Operating Licenses, and Construction and Operating Licenses.—

"a. An applicant for a license to construct or modify a production or utilization facility shall, if the application is consistent with the provisions of this Act, the rules and regulations of the Commission, and public health and safety and the common defense and security be initially granted a construction permit, after the Commission has provided an opportunity for a public hearing under section 189 of this Act. Upon the filing of additional information by the applicant needed to bring the original application up to date and after the Commission has provided an opportunity for a public hearing under section 189 of this Act, the Commission shall issue an operating license to the applicant upon finding that the facility authorized has been constructed and will operate in conformity with the application as amended, the provisions of this Act, and the rules and regulations of the Commission. For all other purposes of this Act, a construction permit is a 'license'.

"b. (1) The Commission shall issue a construction and operating license to an applicant for a commercial production or utilization facility, after providing an opportunity for a public hearing under section 189 of this Act, if the application contains sufficient information to enable the Commission to determine that there is reasonable assurance that the facility will be constructed and will operate in conformity with the application, the provisions of this Act, and the rules and regulations of the Commission. The Commission shall incorporate in the construction and operating license a phased-approval procedure for construction quality assurance. The Commission also shall incorporate in the construction and operating license the inspections, tests, analyses, and acceptance criteria therefor, that are necessary to provide reasonable assurance that the plant has been constructed and will operate in accordance with the license. The Commission procedure also may provide for inspections by the licensee's designated quality assurance inspectors, designated engineering and inspection representatives, and Commission inspectors.

"(2) Before a facility licensed under this subsection may begin operation, the utility shall notify the Commission of its readiness to operate the facility. Based on this notification, the Commission shall publish in the Federal Register a notice of intended operation of the facility, and shall provide a thirty-day period during which any person may file a written objection to operation on the basis that the facility has not been constructed or will not operate in conformity with the license. An objection must set forth in reasonable detail the facts and arguments upon which the objection is based, and may be accompanied by a request for a hearing. If a hearing is requested, the Commission shall conduct a hearing if it determines that there is a material issue in dispute that cannot be resolved with sufficient accuracy except in a hearing and—

"(A) the issue was not and could not have been considered and decided in a proceeding for the issuance, modification, or amendment of a license, permit, or approval for that facility, its site, or design; or

"(B) a showing has been made that there is a nonconformance with the license that could materially and adversely affect the safe opposition of the facility. The Commission also shall determine whether the hearing must be commenced or completed before facility operation begins in order to provide reasonable assurance of the protection of the public health and safety and common defense and security.".

MODIFICATIONS

SEC. 104. Section 187 of the Atomic Energy Act of 1954 (42 U.S.C. 2237) and its catchline are amended to read as follows:

"SEC. 187. MODIFICATIONS.—

"a. The Commission shall not require nor take an action to cause a change to a design approval; a site permit; a production or utilization facility for which a construction permit, operating license, or construction and operating license has been issued; the design of the facility; the procedures under which the facility is to be constructed or operated; or the organization required to construct or operate the facility, unless the Commission determines that the proposed change would result in a substantial improvement in overall safety of facility operation required under this Act and, for a production or utilization facility, is justified when taking account of the remaining life of the facility after considering the following factors—

"(1) the potential reduction in the risk to the public from the accidental off-site release of radioactive material;

"(2) the potential impact on radiological exposure of facility employees;

"(3) the installation and continuing costs associated with the proposed change, including the cost of construction delay or effect on continuity of service;

"(4) the potential safety impact of changes in plant or operational complexity including the effect on other proposed and existing requirements;

"(5) the estimated resource burden on the Commission associated with the proposed change and the availability of the resources;

"(6) the potential impact of differences in facility type, design, or age on the relevancy and practicality of the proposed change;

"(7) whether the proposed change is an interim or final requirement and, if interim, the justification for imposing the proposed change on an interim basis; and

"(8) such other matters as the Commission determines to be necessary.

"b. The Commission shall establish a centralized, systematic, and documented review process to evaluate and consider a proposed change. The Commission may make the proposed change effective, after its determination has been made, only by an amendment to the license or by issuing a rule, regulation, order, or amendment thereof. This section does not apply if the Commission determines that immediate action to impose a proposed change is necessary to protect the public health and safety or the common defense and security. If the Commission determines that immediate action is necessary, it shall document its determination after the fact.".

TITLE II—CONFORMING AMENDMENTS

ANTITRUST PROVISIONS

SEC. 201. The first sentence of section 105 c. (2) of the Atomic Energy Act of 1954 (42 U.S.C. 2135 c. (2)) is amended by striking "a license to construct or operate" and inserting in its place "a license to construct, operate, or construct and operate".

LICENSE APPLICATION REVIEW

SEC. 202. Subsection 182 b. of the Atomic Energy Act of 1954 (42 U.S.C. 2232 b.) is amended to read as follows:

"b. The Advisory Committee on Reactor Safeguards shall review an application to grant, amend, or renew a license, construction permit, construction and operating license, or site permit. The Committee shall review each application for design approval, each proposed amendment or renewal of a design approval, and any application under section 103, 104, or 194 of this Act that the Commission refers to the Committee. The Committee shall submit a report to the Commission on each application, design approval or proposed amendment, or renewal of a rule that it reviews. The Committee decision to review or fail to review an application or proposed amendment or renewal of a design approval and the Commission decision to refer or not refer an application to the Committee, is not subject to judicial review. Except to the extent that security classification prevents disclosure, any report required by this subsection shall be made part of the record of the application or rulemaking proceeding and available to the public.".

REVOCATION

SEC. 203. Section 186 a. of the Atomic Energy Act of 1954 (42 U.S.C. 2236 a.) is amended by inserting—

(1) "or site permit or design approval" after "license", wherever it appears; and

(2) ", 193, or 194" after "182".

ATOMIC SAFETY AND LICENSING BOARD

SEC. 204. Section 191 a. of the Atomic Energy Act of 1954 (42 U.S.C. 2241 a.) is amended by—

(1) striking "or" after "license" and inserting in its place a comma; and

(2) inserting "site permit, or design approval" after "authorization".

TABLE OF CONTENTS

SEC. 205. The table of contents of the Atomic Energy Act of 1954 is amended by—

(1) striking the item relating to section 185 and inserting in its place the following:

"Sec. 185. Construction Permits, Operating Licenses, and Construction and Operating Licenses.";

(2) striking the item relating to section 187 and inserting in its place the following:

"Sec. 187. Modifications."; and

(3) adding after the item relating to section 191 the following:

"Sec. 193. Approval of Standardized Designs.
"Sec. 194. Early Site Approval.".

The CHAIRMAN. Before turning to our first witness, I will ask Senator Hecht if he has a statement he would like to make at this time.

STATEMENT OF HON. CHIC HECHT, A U.S. SENATOR FROM THE STATE OF NEVADA

Senator HECHT. Thank you, Mr. Chairman. I have long been concerned about the great amount of time and money required to license a nuclear powerplant. Even though we are now in a period of low oil and gas prices, we must be concerned about the long run and the time when we will need to be looking at all forms of power and in particular nuclear, geothermal, and coal.

I am pleased we are conducting hearings today on nuclear power. We must retain nuclear power as essential to our national energy security. This Thursday the Subcommittee on Natural Resources Development and Production will hold a hearing on the geothermal energy bill which I introduced. It is important that Congress also encourage development of ultimate energy sources.

I welcome our distinguished witnesses this morning and look forward to their testimony. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Senator Evans.

Senator EVANS. I have nothing. I am ready to hear the testimony, Mr. Chairman.

The CHAIRMAN. We will begin today's hearing with the testimony of John Herrington, the Secretary of the Department of Energy.

Mr. Secretary, it is a pleasure to have you with us again. Before you make your statement, let me thank you very sincerely for your initiative and your leadership on this extremely important issue. Your prepared statment will, of course, be placed in the record in full. You may proceed in whatever manner you prefer.

STATEMENT OF HON. JOHN S. HERRINGTON, SECRETARY OF ENERGY

Secretary HERRINGTON. Thank you, Mr. Chairman. It is a pleasure to be here this morning.

As a preliminary matter, I could not begin this testimony and I could not sit in this chair this morning without recognizing the far-sighted leadership that you, as chairman, have provided, not only in providing these hearings that we are going through this morning, which is a very big plus for this legislation, but your far-sighted history of support for this industry in keeping the nuclear power option open for this country.

It has truly been a great benefit to our energy security and our stability in the long run, and, I think, that the people owe you a debt of gratitude for this.

Mr. Chairman, nuclear power is essential to our national security, and it must be renewed as an option soon or we will be in an untenable situation by the turn of the century. That is a scant 14 years away.

Today the United States has 100 licensed commercial powerplants producing 15 percent of our electricity through nuclear power; 17 plants are under construction and are expected to be completed by 1990. Even with these new plants going into service, additional generating capacity is going to be needed in the 1990's. That is a fact.

Some of the utilities that have to make these decisions on new plant capacity are at a threshold for making these decisions on how to provide this capacity.

I am here this morning to make the statement that nuclear power must be one of the options that they can consider. The annual projected growth rate for electricity in this country is in the range of 2 to 3 percent. We have additions with plants that are already under construction and minus the requirements of less efficient, aging plants. Significant new capacity is going to be needed by the year 2000.

Coal-fired generators are very reliable, and they have proven their worth and will continue to prove their worth. They are needed to meet this increased demand; however, they, too, face difficult technological changes due to environmental considerations.

Oil-fired generators will increase our dependency on foreign oil, something that we will agree will not be good for the country.

Why do we want to reform the licensing process? If a utility ordered a nuclear powerplant today, the cost or delivery dates simply could not be assured. Even if construction were approved, there would be some risk that that plant would never be allowed to operate under the present regulatory process.

The process was put into place over 30 years ago at a time when nuclear powerplants were in the developmental stages, and it has changed over the years in a patchwork fashion since that time. The present process, as we sit here today, is unstable and unpredictable. Its basic framework needs revision to recognize the technical, the social, and the political changes that have taken place over time.

The present design-as-you-go, regulate-as-you-go process exposes utilities and vendors to commitments of enormous sums of money before binding regulatory approvals can be obtained. Nuclear plant licensing in this country takes longer, and the plants are, therefore, more costly than in countries like France which get over 65 percent of their power from nuclear.

The recent Booz-Allen study that you indicated and recognized in your remarks showed that as much as three-quarters of U.S. plant cost increase are due to factors inherent in the licensing and regulatory process. The present process involves the public too early, before the design is complete, and too late, after construction is complete, leading to costly delays when major plant changes are ordered.

Safety and environmental issues, something that we are all concerned with, are not solved until after the projects are started, and sometimes backfits only add to the problems rather than solve them.

Diablo Canyon, for instance, took 17 years to get licensed. Many issues such as seismic design were not resolved until the construction was nearly completed. Zimmer was abandoned after huge sums were invested due to process problems.

Without reform and modernization of the current licensing process I do not know of a utility executive that I have talked to that is likely to bet his company, nor will directors or boards of directors bet their company by ordering nuclear powerplants.

Legislative reform is needed to provide a clear mandate and permanent direction from Congress. This is the only way to ensure stability and predictability in the licensing process.

Fully developed design and standard designs with all major safety and design issues resolved in advance would allow comprehensive public review. Preapproved standard designs eliminate the design-as-you-go process. Preapproved sites would allow comprehensive review before a utility has to make a commitment. Issuing a combined construction permit and operating license would insure that major issues of public concern are resolved before construction starts, not after.

A systematic and centralized process for backfits would eliminate costly changes during construction and result in better quality assurance and enhanced safety for the public.

In short, safety and environmental concerns would be resolved before large financial commitments were made and public participation in the process would be far more effective under this system. Construction of the plant would be under tighter quality assurance, resulting in substantially improved safety and reliability. Preapprovals of design and site will shorten leadtime so that a utility can order a powerplant when the needs for new capacity are firm.

Finally, what are our objectives in attempting to enact this bill? Our objective in introducing this legislation is to retain the nuclear power option for meeting future energy needs. The bill, if enacted, would result in safer, more reliable plants and in increased public participation in the licensing process.

Fully developed, standardized designs will enable early public review of the design without construction pressures. Safety considerations will be resolved at the design stages. Preapproved sites will be reviewed by the public before the utility commitments are made. Combined construction and operating permits will be reviewed by the public before construction commitments are made. The systematic process for considering design changes or other regulatory requirements such as backfits will increase safety.

Nuclear power is at a crossroads. With setbacks over the past decade due to decreased demands for new capacity, increased cost, and a complex and unpredictable licensing and regulatory process, we simply have to remove Federal disincentives caused by licensing and regulatory processes now in order to assure that utilities can consider nuclear for the electricity capacity needed in the 1990's.

Mr. Chairman, thank you very much.

[The prepared statement of Secretary Herrington follows:]

STATEMENT OF
JOHN S. HERRINGTON
SECRETARY OF ENERGY
BEFORE THE
COMMITTEE ON ENERGY AND NATURAL RESOURCES
U.S. SENATE

APRIL 22, 1986

Mr. Chairman, it is a pleasure to be here today. Your hearing brings us one step closer to achieving a critical goal of the Administration's energy policy of stability, security, and strength--reform of our nuclear licensing regulatory process.

I think we can agree that retention of nuclear power as an energy supply source and as a technology is essential to our national energy security and our technological preeminence. It is in all of our interests to determine the best way to maintain and continue building upon the 15 percent contribution nuclear power already supplies to our electricity system. Nuclear power has been successful in this country--more than 100 operating plants have been built since December 2, 1957, when the Nation's first large-scale central station nuclear powerplant reached criticality. The nuclear power option still holds the promise of energy which is clean, secure, safe, and economical. Nuclear power is a technology from the well-spring of U.S. ingenuity. Nuclear power has an excellent safety record--one which we can build upon and preserve for the future.

That technology has been successfully utilized at home and abroad to help reduce dependence on imported oil. Since 1978--the last time an American utility ordered a nuclear plant--over 100 nuclear powerplants have been ordered by France, Japan, Germany, and the USSR. Countries considering nuclear powerplants should be looking to the world's developer of this technology--the United States--but they are not. Why? In part, it is because they believe our American nuclear industry is dying. France and Japan have a streamlined and predictable construction and licensing process and are viewed in some countries as a more reliable supplier of nuclear services. Unless we make major changes soon in the way this country licenses and regulates nuclear powerplants, we can expect no new orders from U.S. utilities. This will lead to further erosion of the industrial infrastructure at home and will likely erode further our ability to market U.S. technology abroad.

It is now over 30 years since Congress enacted legislation to encourage the development and use of civilian nuclear energy for production of electricity. We have experienced in that short span the growing pains of one of man's greatest scientific efforts--harnessing the powerful atom to achieve peaceful ends. The Atomic Energy Act of 1954 was the basis for that effort, and it created what we are trying to preserve today--the conditions for safe and economical use of nuclear power.

Those who foresaw the need for development of a peaceful use for nuclear power recognized that the foundation for success must necessarily involve a partnership between private industry and the public--developing the technology in a manner which would satisfy the needs of both.

The process adopted in 1954 has served the public well. A new energy option was made available to meet the needs of a growing economy. The process that enabled the introduction of this new technology, however, also permitted the construction of nuclear powerplants before all the design and engineering issues surrounding the technology had been resolved. This is why we have today over 100 operating plants--with nearly as many different designs, structures, and open safety issues after 2 decades of development. This diffuses the learning process and unnecessarily complicates the protection of public health and safety.

As a consequence, there has been a significant increase in the scope and depth of regulation. We are now paying the price for that initial rapid introduction of the technology. One major problem confronting the nuclear industry is the existing complex regulatory system that increases costs without a commensurate benefit in terms of effective public participation or enhanced safety. The 30-year old regulatory system does not meet our needs for the future. Reform of the system by which the United States licenses and regulates its nuclear powerplants is critical if the nuclear power option is to be part of our Nation's energy future. For those areas where the Federal Government has become part of the problem, we have the obligation and now the opportunity to become part of the solution. The current process fosters unstable requirements, unpredictable results, and provides for public participation at a time and in a manner that does not best serve the interests of the public, industry, or the Nation.

In 1985, the Department submitted to the Congress a licensing reform bill. That bill was introduced in the Senate as S. 2073 and in the House as H.R. 2488. S. 2073, the Nuclear Facility Standardization Act of 1986, attempts to achieve reform in those areas which need to be addressed to provide a sound foundation for the future use of nuclear power.

GOALS OF LICENSING AND REGULATORY REFORM

The goals of licensing and regulatory reform should be: (1) to improve protection of public health and safety; (2) to improve the effectiveness of public participation; and (3) to restore stability and predictability to the process of constructing, licensing, and regulating nuclear powerplants. Legislation should remove federally created disincentives and unnecessary roadblocks to the development and deployment of safe nuclear power systems. This action would allow utilities again to consider the option of nuclear power on its true technical, economic, and environmental merits.

To realize these goals, legislation should include the following key features, all of which are embodied in the Department's legislative proposal:

- approval of standardized plant designs sufficiently detailed to allow review of all safety systems of a nuclear powerplant for use by any utility;
- approval of plant sites in advance of a utility's decision to construct a plant;
- issuance of a combined construction and operating license based on an approved design and site; and,

- a more lasting, rational, and effective process for design modifications ensuring they will result in substantial improvement in plant safety.

With these features, the public would benefit from more complete information earlier in the licensing process and utilities could once again be in a position to commit to construction of new nuclear facilities with reasonable risk and shortened, predictable construction schedules. A plant built in accordance with approved plans and specifications could therefore commence operation without delay.

I would like to expand briefly on the main goals of safety, public participation, and stability and predictability before commenting in more detail on the specific key features of the Department's proposed legislation.

Safety

The ability of the NRC to approve standardized designs prior to and apart from a utility license application is a major step toward improving powerplant safety. Designers, constructors, operators, and regulators will be able to concentrate their attention on a smaller number of standard reactor plant designs instead of on the numerous designs that characterize the present generation of operating plants. Legislation should also enable firm decisions to be made about major design considerations at the beginning of the process, rather than during construction. Changes to a plant design during construction have often led to reworking portions of the plant already constructed. Not only is time wasted--resulting in increased costs--but there can be a negative morale impact on personnel that does not create a climate conducive to the high quality construction and management that nuclear plants require. Thus, the ability to make early, firm decisions should not only enhance plant safety performance and management, but also improve the economics of nuclear power as well.

A second step toward improving plant safety involves correlating plant modification with improved safety--the so-called "backfitting" problem. The regulatory procedure for making modifications used in the past lacked a disciplined focus to achieve demonstrable improvements in safety. Further, the process did not require consideration of the impact of an isolated modification in one system on the performance of other systems or on the plant's overall safety performance.

In 1981, in the wake of numerous mandated backfits after Three Mile Island, senior NRC staff reported that the pace and nature of regulatory actions had created a safety problem of unknown dimensions. We needed to revise the procedures for modifying plants to help correct these problems--and thereby enhance safety--by establishing a more orderly, focused, and controlled process for determining needed modifications to nuclear plants. This would not impair the NRC's ability to mandate a change; it would require the NRC to focus on changes that provide a substantial improvement in overall plant safety.

The proposed legislative changes to the "backfitting" process are already being implemented administratively by the NRC. To assure lasting policy stability and predictability, however, the requirements for centralized review and a disciplined, rational backfit process should have a statutory basis.

Effectiveness of Public Participation

A second goal is to continue to assure the effectiveness of public participation in the licensing process. The public may now take part in construction permit proceedings and, if they request, in operating license hearings. But, as the Kemeny Commission pointed out, under the current hearing and design review process, many substantive issues cannot be fully considered until the operating license stage, at which point the plant is substantially completed. At this point, with many hundreds of millions--or billions--of dollars already spent, the view of the public cannot, as a practical matter, be considered as effectively as it could be at the beginning of the licensing process. Therefore, the system should include multiple opportunities for public participation early in the process, before firm decisions are made by the NRC and the applicant.

These opportunities for public participation should occur when the standardized plant designs are considered for approval, when sites are considered for approval, and when a combined construction permit and operating license is being considered. If truly new safety issues arise that have not been properly considered and resolved, there should remain a provision for these to be reviewed prior to the start of operation. Early participation will make public influence and expertise more effective in matters related to public health and safety. It will also make for the most cost-effective use of resources by all concerned.

A Stable and Predictable Licensing Process

A third goal of licensing reform legislation should be a stable and predictable licensing process consistent with the current needs of the industry, the regulators, and the public. Stability and predictability will be enhanced if sites and fixed designs are pre-approved, with public concerns raised and resolved before there is a decision to build such units, and if there is a more rational process for making changes. For both the industry and the financial community, the risk in proceeding with a plant would be significantly reduced. For the regulator, stability and predictability will allow allocation of its resources in a more coherent and efficient manner. For the public, stability and predictability will provide confidence for investment and reasonableness in electricity prices.

KEY FEATURES OF THE ADMINISTRATION'S LEGISLATIVE PROPOSAL

I would now like to specifically summarize those key features in S. 2073--features which are essential to achieve the goals I have outlined.

Early Approval of Standardized Designs

The NRC would be specifically authorized to approve standard designs for entire plants or major subsystems, giving utilities the option of choosing a basic plant of preapproved design in lieu of a one-of-a-kind or customized plant design. This design would provide sufficient engineering detail, supported by empirical test data, to allow review of the entire plant from the standpoint of potential safety issues. Prior to approval, an opportunity for a public hearing would be offered. If approved, the design should remain valid for 10 years and be eligible for renewal.

Early Site Approval

The NRC would be specifically authorized to approve utility selected sites for prospective nuclear plants in advance of a utility's decision to construct a plant or apply for a construction permit. The site permit would remain valid for 10 years and be eligible for renewal.

Combined Construction and Operating License

Utilities would be able to apply to the NRC for a construction and operating license simultaneously, as opposed to the current process whereby the construction permit and operating licenses are obtained sequentially, with several years (and sometimes a decade) separating the two applications. Tests, inspections, acceptance criteria, and other phased approvals necessary to provide construction quality assurance would be incorporated as part of the license, allowing NRC inspectors to approve major systems or tests as they are completed rather than at the end of construction. An opportunity for a hearing would be provided prior to issuance of the construction and operating license and on request by any person following completion of construction and prior to plant operation, under certain circumstances. For example, previously settled issues could not be raised merely to intervene in the plant's operation. Utility, investor, and consumer interests must be protected and not abrogated to intervenor actions which are without merit.

Design Modifications

The process by which the NRC has required modifications to designs during and after plant construction has lacked consistency and discipline. This situation could be corrected by requiring the NRC to conduct a centralized review of all staff backfitting proposals. Such a review would result in a more disciplined process for approving backfits--a process based on a quantitative assessment of the seriousness of the underlying safety concern, the value of the safety improvements that would result, and the cost of making the modification. In reaching a decision, the NRC must be assured that the modification will substantially improve the protection of public health and safety over the remaining operating life of the plant. Unless this provision is included in this legislation, we face the risk that changes in NRC practice could negate what standardization attempts to accomplish.

BENEFITS OF THE ADMINISTRATION'S LEGISLATIVE PROPOSAL

Taken together, standardization, early site approvals, single-stage licensing, and the assurance of regulatory stability would markedly enhance predictability. Since designs would be preapproved by the NRC in generic proceedings--following thorough regulatory review and an opportunity for public hearing on safety issues--a utility would know that a design it proposes to use is acceptable before it starts building the plant. Utility executives will be able to estimate with confidence how long the plant will take to build and how much it will cost. And plants will take less time to build and cost less because they will be built according to standard, approved designs rather than being designed as they are built. Standardization has proved itself in nuclear programs elsewhere in the world--most notably France and Japan--and we ought to profit from that experience. These reforms, moreover, will improve NRC regulation by focusing NRC review on a few standard designs, and by doing so far earlier than at present--at the design stage, rather than after the plant has been built. Similarly, they will facilitate public participation by providing a hearing opportunity on each design, site, and combined construction and operating license before a utility has invested substantial resources in building a plant--hearings that will be more meaningful than at present since they will be supported by essentially complete design information. And, of paramount importance, these reforms will increase safety and enhance quality assurance.

CONCLUSION

Nuclear power is a vital component of our electric supply system today. It can continue to be a viable option for future electricity supply for America if the disincentives which have caused it to become an unacceptable economic risk can be removed. For its part, the Federal Government needs to remove the disincentives it has created which have contributed to this situation. The NRC has also submitted a licensing reform proposal. In addition, Representative Broyhill--along with more than 60 co-sponsors--has introduced similar licensing reform legislation that addresses many of the same objectives as the DOE and NRC bills. What we see is a growing consensus on the major issues and on their solution. The Department is encouraged by these actions and urges the Congress to enact the needed legislative solutions to the nuclear licensing and regulatory dilemma facing us today.

Providing new electric generating capacity requires long lead times. We must act now to have a more stable and predictable licensing and regulatory system in place--one which incorporates the key features I have discussed--to permit utilities to realistically consider ordering nuclear powerplants for new generating capacity that even conservative demand projections tell us will be needed in the next decade. This is clearly in the public interest, and I urge your early consideration and action on the Administration's legislative proposal.

Mr. Chairman, this concludes my statement. I will be pleased to respond to your questions at this time.

The CHAIRMAN. Thank you very much, Mr. Secretary.

What does this proposed legislation, S. 2073, do that cannot be done by changes in NRC regulations?

Secretary HERRINGTON. I think in answering that, I would say a majority of the proposed reform measures probably could be implemented administratively by the NRC without legislation, but there are some reasons that, I think, legislation is needed.

One, I think the vendors and utilities are not likely to commit the enormous sums necessary to develop a complete design and go through full litigation of the design and site without the assurance that the rules will not be changed in midstream.

Another reason is that, I think, there are substantial benefits in terms of improved safety and economics to be gained by implementing the concepts proposed in the legislative package. Legislation will provide a clear mandate and a permanent direction from Congress that these benefits are realized. They put Congress in control over reforming the process rather than leaving it to the NRC to do it in an administrative method. It is a good signal, I think, for the industry.

Finally, I think the principal aim of reform is to provide for stability and predictability in the licensing process. With legislation as a basis for reform, there would be a much greater assurance that the lasting effect will be there rather than if it was done administratively and subject to the Commission's change at any time.

Those are the principal reasons.

The CHAIRMAN. Mr. Secretary, what is our experience in this country as compared to other countries, specifically France and Japan, with respect to the cost and construction time?

Secretary HERRINGTON. I think that is the most important question that we are looking at. I would like to put a detailed analysis of that in the record, and I would like to also hit a few high points regarding standardization in these countries.

The CHAIRMAN. It will be made a part of the record when we receive it.

[The information referred to follows:]

COMPARISON OF NUCLEAR POWERPLANT COSTS AND CONSTRUCTION TIMES AMONG THE UNITED STATES, FRANCE, AND JAPAN

In France, the cost of nuclear generating units coming on line in 1984 and 1985 ranged from $800 to $1,100 per installed kilowatt and the construction time for recent plants in France ranged from 5 to 7 years. In Japan, for nuclear generating units coming on line during the same time period, the cost from $1,100 to $1,800 per installed kilowatt. The construction period for recent Japanese plants has ranged from 4 to 7 years.

By comparison in the United States, plants which were completed in the early 1980's and that were in the latter stages of construction prior to delays and subsequent cost increases resulting from an inefficient and complex regulatory system, delays due to reduced demand and power, and construction problems, had capital costs ranging from $800 to $1,800 per kilowatt and an avarage construction time of 7 to 8 years, or in the same general range as those in France and Japan. However, United Stated plants coming on line in the same time period as the French and Japanese plants (1984 and 1985) had costs of $1,700 to $3,900 per kilowatt due to the problems cited above and construction time of 8 to 16 years.

Secretary HERRINGTON. Thank you, Mr. Chairman. I think if I could make a couple of comments, France adopted a standardization policy in 1975 and they focused primarily on

PWR's [pressurized water reactors] and excluded the BWR's [boiling water reactors]. They built two sizes, 900 megawatts and 1,300 megawatts. Today they have 34 900-megawatt units, and these have essentially identical nuclear islands. They built those plants between 1976 and 1982. They have 20 1,300-megawatt reactors, essentially identical units, completed or under construction during 1976–86.

This is something we could probably never come to in this country, but in addition they have one single plantowner that acts as its own architect and engineer. They have one single manufacturer. They have one single contractor for the turbine generators and one single industrial firm, Cogema, to handle the fuel cycle.

Their procurement strategy is that each equipment supplier receives orders for a whole series of plants but with the obligation to use the same procurement source and the same subcontractors.

Standardization is limited to their systems and their components, their installations, their buildings and structures, and their controls. The foundations, waste heat rejection methods, and the connections to the grid are all site specific. I think France has probably done the most standardization.

Japan is less standardized than France, but is more so than the United States. I think that is changing. From what I have seen on my recent trip to Japan and from conversations I have had, my estimate would be that the most aggressive exporter of nuclear power components and technology will be Japan in the future. Today they have nine electric power companies, eight of which have nuclear plants.

They build both PWR's and the BWR's; however, four utilities have built PWR's, and they built them exclusively. Four utilities have built the BWR's exclusively, so there is standardization within those plants. There are two nuclear suppliers for BWR's and one supplier for the PWR's. Thirty plants were operating by 1986, with most sizes, after the initial part of the program, being built as series of units to achieve the benefits of standardization.

Their future program is a third phase improvement and standardization program done in cooperation with Westinghouse and General Electric from this country.

In the United States we have had little standardization—we have 100 operating plants, 60 utilities, 4 reactor vendors, and more than a dozen architect engineering firms. The best experience has been with multiple units on one site but due to new and changing requirements, even these plants are not fully replicated.

I think those are general comments, Mr. Chairman, but they are all important as we view this licensing procedure.

The CHAIRMAN. Thank you very much, Mr. Secretary.

Let me turn for a moment to another aspect of the pending legislation, and that is the opportunity for public hearing. On matters which, I think, we all want to preserve, and, I think, we all want and are very concerned about, the public reaction to any licensing change is important.

Are the opportunities for public hearings broadened or restricted in the DOE bill as compared to present practice?

Secretary HERRINGTON. I think you could say they are expanded in some cases and restricted in others.

If I might explain, early on in the process when site selection is made and the type of reactors or the investment decisions have to be made, I think we are expanding public participation especially on issues of safety and environment and the important issues that much of the public is concentrating on.

I think once a decision has been made to go forward under this law, the later hearings are more restricted to protect the investment and the rights of the utilities after the public process has been completed in the first part.

The CHAIRMAN. So it is a question of timing as much as substance?

Secretary HERRINGTON. Yes, sir.

The CHAIRMAN. Thank you very much.

Senator Hecht.

Senator HECHT. Thank you, Mr. Chairman. Mr. Secretary, I have no questions for you at this time but I do want to commend you on your statement and what you are doing to ensure that America will have energy in the year 2000 and beyond. It takes far-sighted thinking, and you are doing that. I commend you for it.

Secretary HERRINGTON. Thank you, Senator.

The CHAIRMAN. Thank you, Senator Hecht.

Senator Evans.

Senator EVANS. Thank you, Mr. Chairman. I have a sense of deja vu almost in listening to the testimony and particularly reading the elements of this proposed legislation which is on page 4.

I think that those reflect almost precisely recommendations which we made at the State level almost 15 years ago in the State of Washington, and I just wonder why it has taken us so long to get to this point. I guess maybe we can learn something from history, but we have thrashed around in this morass which has existed in the nuclear industry for a dozen years at least. We as yet have not taken what appears to me to be vital, responsible, and easily identifiable steps forward.

Of course, none of that happened on your watch, so you can speak with candor.

Secretary HERRINGTON. Senator, I have spent 20 years reading the newspapers about the status of this industry, and I am aware of the far-reaching suggestions that the State of Washington made 15 years ago.

I do not have the answer. I think you are going to talk to some very good industry executives on some of these panels. The tendency has been to overregulate. That is obvious in retrospect, and is sort of a Monday morning quarterbacking. I think that has happened for several reasons.

We have, as a country and as a people, become more environmentally sensitive. We are more interested in safety. There are things that have happened that, I think, should give people heart to move into this new era.

The technology in the United States today is the best in the world. Even though other countries have taken some of that technology and utilized it better, we still have the cutting edge of technology in this country. We know how to do safe, environmentally sound, and efficient nuclear powerplants in this country probably better than any other country in the world today.

We have not gotten around to standardization, and, I think, therein lies the key to some of our problems. Every single plant is unique. Every one is different. Every one requires different hearings, different rules, and different specifications. I liken it to a situation when I was back in California.

We were going to build a new high school. The first thing we did was hire a new architect to come build a high school. He went around the town and saw all the high schools and decided he wanted to build one that was bigger and better, with his own imprint on it.

A high school to me has one function, and that is to educate high school students. You need a gym, a pool, some classrooms, locker rooms, and auditoriums. There are certain things you need. You do not have to build each one unique and separate.

I think that is where we are in this industry. It is time to focus our attention on our need past the year 2000.

Senator EVANS. That gets us. I know that this administration and, I think, most in Congress endorse the opportunity for free market work. This legislation would move us a substantial distance away from what we would normally consider a free marktet. We are engaged in what we hope will be simplified but probably more extensive governmental regulation in terms of who can build and what they can build and how they can build and who can buy and what they can buy and how they can buy.

Do you think, under the circumstances, that this governmental direction in order to revive the industry?

Secretary HERRINGTON. My answer to that is a simple yes.

You cannot interfere with the market when there is no market, and there is no market in this industry. I think we need to establish a market.

Senator EVANS. I suppose under a free market system if there is no free market I would suggest that there is no need.

Secretary HERRINGTON. That would be a trap that we should not fall into.

In regard to your comments on limiting, let me say that I worked in the Pentagon for 1½ years ~~for~~ this administration. Probably the greatest initiative in the Pentagon that I saw during my time there was dual sourcing of a single design. It led to competition among suppliers to get costs down. To me, that would be a great boon to this industry.

Senator EVANS. That leads me into more specific questions on this might work.

Would you anticipate that certain broad specifications would be set forth for a design competition or at least for submission of designs which could be preapproved? In other words, would you request designs for 800 or 1,000 megawatts or certain basic parameters for the plant under which designs could be presented?

Secretary HERRINGTON. I think a couple of comments are necessary here.

No. 1, I do not think it is the function of the Federal Government to call for certain designs at certain levels. I think what we need to do is get heavy input from utilities, industry, consumers, and local power distribution companies. We need to know what is needed out there.

There is a lot of comment in the industry today that maybe the 1,000-megawatt reactors are dinosaurs and are too far out; maybe we ought to go to a smaller, compact reactor. I do not know. I am not sufficiently in the process at this point to say that this is the feeling among users in the industry. What we need to do is get their input.

Senator EVANS. All right, that would sort of precede what I am talking about. Once that effort has been carried out, from that you would develop or zero in on a particular size and style and type of plant. I presume that might even include, depending on the utility and other comments, plants that can be continuously refueled while still under operation, as is the case in Canada.

Once that has been done, would you then anticipate that there would be open competition, or would there just be submission by various potential manufacturers and designers of plants that would meet that specification and would then be preapproved?

Secretary HERRINGTON. I think there should be competition, Senator, to approach this problem. I do not know what form that competition would take. I have strong feelings that we should not attempt to take an existing design or an existing reactor that is in place and modify it and say we are going to stamp out 100 of those.

I think the technology has evolved to the point we need to design a new look at this problem. I think it is good for the industry. It is good for the public, and good for the technology.

I have seen so many reactors in the last 1½ years that have had so many, to use the term, bells and whistles hung off them and modifications and backfits. To try and go in and work with those, I think, would be very difficult.

Senator EVANS. Well, I would thoroughly agree that since nobody has ordered a plant since 1978 we are not stalling anybody very much if we start fresh and come up with something better. I still am not quite sure, though, which one of what it seems to me are two directions you might take once you had identified the basic parameters of a new style plant.

It seems to me we could go one of two ways. One would be to have anyone present their designs and their proposals that would meet those parameters. Assume we had, say, 10 manufacturers and designers, I suppose it is possible that all 10 might have quite different designs that all meet those parameters, and you could approve all 10. Utilities could choose from among them.

The alternative would be to say, all right, you 10 come in with your designs and we will choose which 2 or 3 make the most sense and which appear to be the best and confine the plants that would have preapproval to just those 2 or 3 that win the design competition.

Do you have any opinion at this point as to which of those two directions you might take?

Secretary HERRINGTON. I only have a general sense, and I would like to give it some more thought. I think the utility industry has to develop what I might call the bid specifications of what is needed and what they would buy. Then, I think, the vendors have to develop the matching designs. How you choose between those designs I have not thought through.

Senator EVANS. One of the things that the Northwest Power Plan has contemplated is the potential use of what we call options, which is to shorten the time of uncertainty for utility. I think it is the uncertainty of both the power needs a dozen or 15 years from now and the cost and the problems of getting there with nuclear power that has killed the nuclear power industry.

An attempt to shorten that period of uncertainty would be to go through the preliminary processes of environmental considerations, design and preparation, right up to the point of construction. That takes most of the time but not very much of the money.

At that point, if a utility or an authority like Bonneville, for instance, was able to purchase that option and put it on the shelf, it would mean that construction presumably could be delayed for one, several or a number of years until the need became clearer, and then construction could start, and you could have the plant on line in a relatively few years afterward.

That contemplates the ability to hold those plants and maintain their licenses during that period of option. Do you contemplate this as being part of what might come out of this legislation?

Secretary HERRINGTON. I think that is a very valuable suggestion. I think that would be a good consideration.

Senator EVANS. On backfits, it seems to me that, at least in our experience in the Northwest, part of what really killed the public power supply system's plants and drove the cost clear out of sight, other than the increase in interest rates and construction costs and all the other problems were the enormously costly backfits which were required by the Nuclear Regulatory Commission.

During and after construction there was more tearing out and putting back in than virtually anything else that was going on for several years there.

What is your anticipation on the necessity of backfits on the standardization of plants for a certain period of time and perhaps the accumulation of these desirable changes and then at some point a move to a second model of a plant or a new model where all the backfits would be incorporated for plants in the future but none would be required for plants under construction or already licensed?

What is the necessity of going back and going through those costly backfits? Maybe there are two different categories, those that are absolutely necessary for safety and those that are desirable but could be postponed.

Secretary HERRINGTON. I think the backfitting problem has been one of the most troublesome. Certainly we would never want to overlook backfits that were absolutely necessary, but people financing it on their construction contracts need to rely upon approved design. So, obviously, anything we do we should try to minimize backfits to every extent possible.

We have read recently that some of the backfits probably weren't necessary, and some of the backfits that have been required possibly were not as safe as the way they were originally designed.

So, I, think, we have been a little overzealous in the backfitting requirements that we have put forward.

Senator EVANS. A final question. Is, in your view, the Nuclear Regulatory Commission's organization and method of operation that is required by law a bar in itself to appropriate review of safety? I am thinking particularly of the question as to whether the Chairman of the Nuclear Regulatory Commission ought to have more authority than the Chairman now does?

Perhaps my favorite size of commission as political chief executive officer was one, and I still think that is a pretty good idea. How about just the organization currently of the Nuclear Regulatory Commission? Should we investigate whether that should be changed as an integral part of this whole streamlining process?

Secretary HERRINGTON. I think I would support the single administrator concept, and I do not say that in derogation of any of the sitting commissioners because I think they are working under a very difficult environment, especially with the industry as it has been.

We have many examples in this Government of single administrator independent regulatory commissions that are very successful: FAA; FDA; EPA. We can go on and on. There are some very fine organizations that work on this basis that do a heck of a good job, and, I think, simplification in this case might be called for.

Senator EVANS. Thank you, Mr. Chairman. I will have some other written questions.

The CHAIRMAN. Thank you, Senator Evans.

Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman.

Mr. Secretary, I apologize but I have not had an opportunity to review your statement. I am interested in just your short evaluation of the current attitude in the sense of developing further utilization of further powerplants in this country.

You indicated that the last time an American utility ordered a nuclear powerplant was in 1978?

Secretary HERRINGTON. Yes, sir.

Senator MURKOWSKI. As a consequence of the difficulties, I assume, we have lost substantial technology to foreign competitors in the area.

My direct question is are we going to be so far behind with the technology, the state-of-the-art technology, that it is unlikely that we could expect our firms to be competitive? Should we again pursue nuclear power generation with orders?

Secretary HERRINGTON. My feeling is that American industry is extremely competitive, and that given the right environment and the opportunties they can do the job to give us this nuclear option. Even though they are not selling plants in the United States, they are selling abroad.

The French technology is based on Westinghouse designs and technology, and the same is the case with the West Germans. We still have probably the finest technology base anywhere in the world and the best companies, the best engineers, the best designers. Yes, they have not been as active as we would like them to be, but I have no question that they can pick up this baton and do a heck of a job on it.

Two companies today, GE and Westinghouse, are actively working with the Japanese Government on new reactor designs. What we need to do is open the path for them to give us this option.

Senator MURKOWSKI. My last question, Mr. Secretary is: Is it not practical to assume that it would be more expeditious to develop a standard prototype? In other words, a nuclear powerplant that was designed along with the regulatory agency's concern over the permitting process, so as the design took place step by step there was a communication with your Department as to the permitting so that when you had a complete design, it would be a standard design that would not run afoul of the uniqueness of a custom design which requires different analysis each time?

I am just wondering, is that conceivably an alternative to try and get greater acceptance of nuclear power in the United States by developing a standardization that perhaps we have not had before?

Secretary HERRINGTON. Yes, sir, I think that is a good suggestion.

Senator MURKOWSKI. Why has it not been done, or why is that not a reasonable answer to a lot of the problems associated with nuclear powerplants today? It seems like each one is almost a custom. I assume the technology dictates that you are going to put new processes and procedures, but it seems to me we are hung up on this matter each time the process starts again.

Secretary HERRINGTON. Yes, sir. I think that is a good point that you raised. Our process started 30 years ago, and it has built up on a patchwork basis to the point that I think we are due for major changes to match the social concerns and the political concerns.

With all of the technological progress that we have made, we are at a point now where it is time to take a look at it because we are beginning to hurt ourselves.

Senator MURKOWSKI. I wonder if it is conceivable that your office would lead the way with our firms, Westinghouse and GE, to encourage perhaps a joint development. Is that conceivable, or are you thinking about that?

Secretary HERRINGTON. I think it is conceivable, and I did not mean to single out Westinghouse and GE. There are a number of other firms who are right up there at that technological level. I only mention them, bear in mind, because of their current program with the Government of Japan, on a more standardized and more modular type reactor, I think that is some of the area we need to go to.

Senator MURKOWSKI. I just wondered if it is appropriate of your Department to attempt to coordinate and lead the way in making such a thing possible or encouraging it to happen.

Secretary HERRINGTON. I think it is an appropriate function for the Federal Government to encourage it to happen. I do not know if it is a good plan for the Department of Energy or the NRC to set forth what we think the solution is.

What I would like to see is the users and utilities draw up the specifications for what type of reactors they need and then put that design out to the industry to compete on those specifications. I think it is the Government's job to monitor, to watch it very carefully, and to make sure that environmetal concerns are met, but I do not know that the Federal Government is the best vehicle to set designs in attempting to do that. We need to work with them and encourage them.

Senator MURKOWSKI. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Bumpers.

Senator **Bumpers**. Mr. Chairman, first of all I ask unanimous consent that a statement of mine be inserted in the record at the time opening statements were being submitted.

The **Chairman**. It has been inserted in the record.

Senator **Bumpers**. Second, let me say that I certainly agree with the thrust of S. 2073 and the attempts to standardize as best we can the designs and construction of nuclear plants. I really do not have any questions. I just wanted to make two or three observations.

Nobody is more painfully aware of problems in our neclear industry than I am because of the ravages being inflicted on my State with one nuclear plant, and if we do not get something done, a third of another one. That plant, for example, cost, I believe, $3.42 billion. I am referring to Grand Gulf, of course. That plant cost $3.42 billion, and the original cost estimate was $854 million, so it had a 300-percent increase, or $2.5 billion.

Sometimes, I think, prudency studies are done well, and sometimes I do not think they are done so well. In this case, I do not think the prudency study was very good. One that was commissioned, I believe, by the Mississippi Public Service Commission showed that the cost overruns because of the lack of prudency were fairly minimal. I do not really know what the actual figure is, but I certainly think that imprudency caused a great deal more of the cost overruns than that.

My point is this. Anytime we get into these prudency tests and cost overruns of this magnitude, the contractor and the utility always say NRC caused it. They kept changing this and changing that, and we never knew from one day to the next. There is enough truth in all of those accusations, no matter where the plant is being located, to give that argument some credibility and let people who may have been imprudent off the hook and result in the ratepayers always being stuck with the tab.

So if this bill can be marked up here in such a way that we have some assurance that we can standardize the design that would be effective for 10 years but still leave room for NRC to make modifications in the plans where safety demands it during that period of time, then I will certainly be happy to vote for it.

So I am pleased we are considering the bill. I am not an expert on it; I am just speaking topically about some of the problems we have had in the past. I have heard too many arguments since I have been on this committee.

Mr. Secretary, no reflection on you, but, I think, you are either the fourth or fifth Secretary of Energy we have had since I have been here in 11 years, and the lack of continuity in commitment to this kind of legislation is one of the reasons in my opinion that this committee and the Congress has not dealt with it in the past.

Thank you, Mr. Chairman.

The **Chairman**. Thank you.

Senator Domenici.

Senator **Domenici**. Mr. Chairman, I come here obviously because I support your efforts in trying to reform the existing law. I am aware that we have a jurisdictional problem with the Public Works Committee, and, frankly, I am hopeful that under your leadership and that of Senator Stafford that we can proceed expeditiously to get a bill reported out and let the U.S. Senate decide whether what we have got working for us now is as good as it ought to be.

I was here on Price-Anderson, and I can recall giving you my compliments and saying I do not understand why there is so much concern about extending it and extending the limits, as I recall a very important issue when I made the statement on that one.

We have had very few things that we have legislated that are complicated that I would say work, and so on that one I said that if it is not broken, why fix it? This is exactly the opposite here. There is no question that what we have is broken, broken down, any other words you want to add, and so we ought to fix it.

I came to ask questions about Japan and France, but I understand you asked them. I would only recall here that you and I were in Japan on a tour with seven Senators. I can vividly recall the statement by their counterpart to our Secretary of Energy, as you presented nuclear issues and reminded them that they were doing a good job, I believe they told us, Senator, that over the next 6 years they were going to do better without one stitch of waiver of safety.

We will be down to 4 years pretty soon. I do not know if they are there yet. They told us they planned one that might take 4 years and that they changed their procedures.

I just cannot believe that the country that started all of this and showed them all how to do it could still have the system that we have. Senator Bumpers described part of it, but I would hope that if we do not get enough support on this committee and any other committee that you might consider enlightening the Senators, including this one.

I am certainly not contending that I understand but maybe we ought to have a day's hearing and just see how we run the licensing process. I would venture to say there are not two Senators that understand what that group of five go through. I mean, in addition to not being able to meet without having a public hearing on something as complicated as this.

It would be interesting to see how the delays occur.

The CHAIRMAN. If the Senator would yield, I think it might be worth highlighting at the moment. It is not just that they cannot meet, they cannot even talk to each other.

Senator DOMENICI. In fact, I think at one hearing, you and I were here and we saw them whispering to each other, I remember. We said to them they ought to be very careful. [Laughter.]

The CHAIRMAN. Some people get nervous when they sit together. [Laughter.]

Senator DOMENICI. It really cannot be that we have to take 12 to 16 years and we have not done such a remarkable job in all that time. My understanding is Japan does better, at least in terms of the objective standards that are used by the international community, of measuring that ultimate accomplishment of safety. They are doing better than we are.

I might say, however, I do not think it is continuity of secretaries and positions. As Senator Bumpers has indicated, it would be nice to have the status every 6 months.

I frankly believe there are an awful lot of people in the United States that participate in nuclear regulatory activities, including an awful lot of lawyers, that really like it as it is. There are an awful lot of groups in this country that like it as it is, whether they are antinuclear in their basic premise or not. I assume a number of them are.

I just believe that is going to be the ultimate problem, that this will not be turned into an issue of doing a better job. It will be turned into an issue of under the surface that there are very large groups that just do not want nuclear energy period.

This is the process. The process we have had is marvelous for them from what I can tell. It is right up their alley. I hope we will move with some dispatch. I compliment you again for doing it.

Thank you, Mr. Secretary.

The CHAIRMAN. Thank you, Senator. I think your remarks are very appropriate. I am sure we will find as we go through this process that those groups who really do not want to change will be heard from.

With respect to the jurisdictional question, you describe it as a problem, and from one standpoint it is a problem. We were, however, able to resolve the procedural question within the Senate and do successfully the nuclear waste disposal legislation. I think we are on the same course here, and I think it will work as successfully as it did in that instance.

Mr. Secretary, there are other questions that will be submitted to you in writing for response for the record. All members will have until the close of business tomorrow to prepare and submit such questions, and we would appreciate your prompt response.

Senator BUMPERS. Mr. Chairman, was the letter from Commissioner Asseltine to you put in the record?

The CHAIRMAN. No, it was not but it will be put in the record if you request it.

Senator BUMPERS. I would like to request that.

The CHAIRMAN. That will be made a part of the record.[1]

Secretary HERRINGTON. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Mr. Secretary.

We will next hear from members of the Nuclear Regulatory Commission: Mr. Nunzio J. Palladino, the Chairman, Thomas M. Roberts, Commissioner, Fred M. Bernthal, Commissioner, and Lando W. Zech, Jr., Commissioner. I believe Commissioner Asseltine was unable to be here, and if I understand it correctly the letter which you just referenced, Senator Bumpers, is appended to the testimony and will be made a part of the record as a part of that testimony, if that is satisfactory to you.

Senator BUMPERS. It is indeed.

The CHAIRMAN. Thank you very much, indeed. Mr. Palladino, of course the entire statement will be placed in record in full at this point. You are invited to proceed in whatever way you desire.

---

[1] The letter from Mr. Asseltine follows Mr. Zech's prepared statement.

STATEMENT OF HON. NUNZIO J. PALLADINO, CHAIRMAN, NUCLEAR REGULATORY COMMISSION, ACCOMPANIED BY THOMAS M. ROBERTS, FREDERICK M. BERNTHAL, AND LANDO W. ZECH, JR., COMMISSIONERS

Mr. PALLADINO. Thank you, Mr. Chairman. Mr. Chairman and members of the committee, we are pleased to appear before you today for the purpose of discussing nuclear powerplant licensing reform legislation. The Nuclear Regulatory Commission and the Department of Energy have both submitted legislative proposals for congressional consideration.

The Commission believes that the time is long overdue for licensing reform legislation. The current NRC licensing process has not changed substantially since it was originally enacted 32 years ago. In the Atomic Energy Act, that licensing process was a prudent course to follow when the nuclear industry was in its early conceptual and developmental years. In the early years there were many first-time nuclear powerplant applicants, designers, and constructors and numerous developmental design concepts. Accordingly, the process was structured to allow licensing decisions to be made while the design work was still in progress and to focus on case specific reviews of individual plantsite considerations.

One of the primary shortcomings of the present system is that it lacks predictability and stability. This is due in large part to the configuration and implementation of the two-step licensing process. The design of the plant and the regulatory standards for reviewing the design are not well fixed at the time a construction permit application is filed. The design is actually developed during the course of construction to meet regulatory standards which may also change.

The inspections, tests, and analyses which need to be performed are not fully defined until the operating license review has been well underway. Thus, the Commission and the applicant do not reach agreement at an early stage with respect to the detailed implementation of NRC requirements.

Extensive additional tests and analyses are sometimes required late in the construction process. This may lead to plant modification which could have been avoided by identifying the inspections, tests, analyses, and acceptance criteria at the time that the plant was licensed for construction.

With the maturation of the industry, it is now possible to describe and evaluate: (a) standardized plant designs on a generic basis; (b) essentially complete designs prior to plant construction; and (c) proposed plantsites without plant design details.

Accordingly, the Commission has concluded that the licensing process must be reformed to reflect these and other developments concerning the licensing review of nuclear facilities. Reform of the licensing process is an essential step for renewed utility interest in the nuclear power option for the future generation of electricity.

After a thorough review of its current licensing process, the Commission has determined that it could be improved and stabilized if Congress enacted legislation which encouraged nuclear power plant standardization, facilitated early site reviews, and permitted issuance of a combined license to construct and operate nuclear power plants. Both the NRC, in S. 836, and the DOE, in S. 2073, proposals contain these features.

Many of the deficiencies in the licensing process could be eliminated through standardization of light power reactor designs. Standardization should ideally encompass essentially complete designs of the plant. Under the proposed legislation, the procedures would be established which would provide for Commission consideration of standardized designs that could be generically approved in advance of the receipt of a specific license application.

Subsequently, if the utility proposes to use the approved design, no further review of the design would be required except to assure that the conditions for approval of the design have been complied with and that the design is suitable for the site selected.

The Commission believes it is important for Congress formally to endorse standardization through enactment of licensing reform legislation that encourages the use of standardized designs. The use of standardized designs offers the potential to reduce today's lengthy construction times and costs.

More significantly from the viewpoint of the Commission, standardization should facilitate high quality construction and safe operation of specific plant designs. For example, standardization would stimulate standardized programs of quality control and make for better, faster training of operators and workers.

Additionally, experience gained from one or another aspect of operations would be relevant to the operating personnel equipment and procedures of standardized plants, wherever they are located. Exchanges of information between utilities would be more valuable. Lessons learned could be readily applied to other plants using the same standardized designs. In sum, standardized designs could improve plant safety and reliability.

The proposed legislation also adds new sections intended to permit the resolution of site specific questions at an early stage in the licensing process. The legislative proposals include provisions which authorize the Commission to issue a site permit even though no application for a construction permit or a combined CP/OL has been filed.

These sections have been proposed to facilitate early identification and resolution of site issues. After giving an opportunity for public participation, subsequent facility applications could reference a site permit, and final site determinations would be made binding unless there is a substantial reason not to do so.

Finally, the legislative proposals before Congress would permit the NRC to issue a combined construction permit and operating license. The NRC could not adopt one step licensing with the opportunities for hearings as defined in the bill without legislation.

A one step licensing process would add further predictability and stability to the licensing process by giving the licensee greater assurance that if the facility is constructed in accordance with the terms of the CP/OL license that the facility will be permitted to operate once construction is complete without the possibility, as under the present system, that operation of a completed plant may be postponed indefinitely solely for procedural reasons.

Under the current statutory provisions, a public hearing may need to be held prior to the issuance of an operating license. Under the legislative proposals, opportunities for public participation and public hearings will be focused on approvals at the beginning of the process before construction is commenced and long before any substantial construction has occurred.

The proposals also provide that construction quality will be assured through a program of inspection, tests and analyses. That program will be specified in the combined construction permit and operating license when it is issued after opportunity for public hearing.

Although the NRC and DOE legislative proposals are quite similar, there are differences between the two proposals. The differences between the bills are small, and these differences could be readily resolved in committee markup. An example of the differences is that under the NRC proposal the combined CP/OL standardized design licensing reforms would apply only to light water power reactors. DOE would have the reforms not only apply to the light water power reactors but also to applications for breeder reactors and reprocessing plants.

Because the Commission has not recently completed a review of a license application for a breeder reactor or a reprocessing plant, we are reluctant, in the absence of experience, to recommend the streamlined procedures set forth in our legislative proposal.

In conclusion, the Commission urges Congress to enact licensing reform legislation. Although no new power reactors have been ordered for several years, the statutory structure of the existing license process should be changed now. The one step licensing process envisioned by the bill can only be brought about by legislation. The licensing systems ought not to be an unwarranted obstacle to the continued timely availability of nuclear power to help provide a share of the national energy mix when the need for new generation capacity arises.

Mr. Chairman, this concludes the Commission's prepared statement. We appreciate the opportunity to discuss these important matters with the committee this morning, and we will be glad to respond to any questions you may have.

[The prepared statements of Mr. Palladino, Mr. Zech and a letter from Mr. Asselstine follow:]

PREPARED TESTIMONY
SUBMITTED BY
UNITED STATES NUCLEAR REGULATORY COMMISSION
PRESENTED BY
NUNZIO J. PALLADINO, CHAIRMAN

TO THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

CONCERNING
LICENSING REFORM

SUBMITTED: APRIL 22, 1986

MR. CHAIRMAN, MEMBERS OF THE COMMITTEE, I AM PLEASED TO APPEAR BEFORE YOU TODAY FOR THE PURPOSE OF DISCUSSING NUCLEAR POWER PLANT LICENSING REFORM LEGISLATION. THE NUCLEAR REGULATORY COMMISSION AND THE DEPARTMENT OF ENERGY HAVE BOTH SUBMITTED LEGISLATIVE PROPOSALS FOR CONGRESSIONAL CONSIDERATION.

THE COMMISSION BELIEVES THAT THE TIME IS LONG OVERDUE FOR LICENSING REFORM LEGISLATION. THE CURRENT NRC LICENSING PROCESS HAS NOT CHANGED SUBSTANTIALLY SINCE IT WAS ORIGINALLY ENACTED 32 YEARS AGO IN THE ATOMIC ENERGY ACT. THAT LICENSING PROCESS WAS A PRUDENT COURSE TO FOLLOW WHEN THE NUCLEAR POWER INDUSTRY WAS IN ITS EARLY CONCEPTUAL AND DEVELOPMENT YEARS. IN THE EARLY YEARS THERE WERE MANY FIRST-TIME NUCLEAR POWER PLANT APPLICANTS, DESIGNERS AND CONSTRUCTORS, AND NUMEROUS DEVELOPMENTAL DESIGN CONCEPTS. ACCORDINGLY, THE PROCESS WAS STRUCTURED TO ALLOW LICENSING DECISIONS TO BE MADE WHILE DESIGN WORK WAS STILL IN PROGRESS AND TO FOCUS ON CASE-SPECIFIC REVIEWS OF INDIVIDUAL PLANT-SITE CONSIDERATIONS.

ONE OF THE PRIMARY SHORTCOMINGS OF THE PRESENT SYSTEM IS THAT IT LACKS PREDICTABILITY AND STABILITY. THIS IS DUE IN LARGE PART TO THE CONFIGURATION AND IMPLEMENTATION OF THE TWO-STEP LICENSING PROCESS. THE DESIGN OF THE PLANT AND THE REGULATORY STANDARDS FOR REVIEWING THE DESIGN ARE NOT WELL FIXED AT THE TIME A CONSTRUCTION PERMIT APPLICATION IS FILED. THE DESIGN IS ACTUALLY DEVELOPED DURING THE COURSE OF CONSTRUCTION TO MEET REGULATORY STANDARDS WHICH MAY ALSO CHANGE.

THE INSPECTIONS, TESTS, AND ANALYSES WHICH NEED TO BE PERFORMED ARE NOT FULLY DEFINED UNTIL THE OPERATING LICENSE REVIEW HAS BEEN WELL UNDER WAY. THUS, THE COMMISSION AND THE APPLICANT DO NOT REACH AGREEMENT AT AN EARLY STAGE WITH RESPECT TO THE DETAILED IMPLEMENTATION OF NRC REQUIREMENTS. EXTENSIVE ADDITIONAL TESTS AND ANALYSES ARE SOMETIMES REQUIRED LATE IN THE CONSTRUCTION PROCESS. THIS MAY LEAD TO PLANT MODIFICATION WHICH COULD HAVE BEEN AVOIDED BY IDENTIFYING THE INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA AT THE TIME THE PLANT WAS LICENSED FOR CONSTRUCTION.

WITH THE MATURATION OF THE INDUSTRY, IT IS NOW POSSIBLE TO DESCRIBE AND EVALUATE (A) STANDARDIZED PLANT DESIGNS ON A GENERIC BASIS (B) ESSENTIALLY COMPLETE DESIGNS PRIOR TO PLANT CONSTRUCTION, AND (C) PROPOSED PLANT SITES WITHOUT PLANT DESIGN DETAILS. ACCORDINGLY, THE COMMISSION HAS CONCLUDED THAT THE LICENSING PROCESS MUST BE REFORMED TO REFLECT THESE AND OTHER DEVELOPMENTS CONCERNING THE LICENSING REVIEW OF NUCLEAR FACILITIES. REFORM OF THE LICENSING PROCESS IS AN ESSENTIAL STEP FOR RENEWED UTILITY INTEREST IN THE NUCLEAR POWER OPTION FOR THE FUTURE GENERATION OF ELECTRICITY.

AFTER A THOROUGH REVIEW OF ITS CURRENT LICENSING PROCESS, THE COMMISSION HAS DETERMINED THAT IT COULD BE IMPROVED AND STABILIZED IF CONGRESS ENACTED LEGISLATION WHICH ENCOURAGED NUCLEAR POWER PLANT STANDARDIZATION, FACILITATED EARLY SITE REVIEWS, AND

PERMITTED ISSUANCE OF A COMBINED LICENSE TO CONSTRUCT AND TO OPERATE NUCLEAR POWER PLANTS. BOTH THE NRC (S.836) AND DOE (S.2073) PROPOSALS CONTAIN THESE FEATURES.

MANY OF THE DEFICIENCIES IN THE LICENSING PROCESS COULD BE ELIMINATED THROUGH STANDARDIZATION OF LIGHT POWER REACTOR DESIGNS. STANDARDIZATION SHOULD IDEALLY ENCOMPASS ESSENTIALLY COMPLETE DESIGN OF THE PLANT. UNDER THE PROPOSED LEGISLATION, PROCEDURES WOULD BE ESTABLISHED WHICH WOULD PROVIDE FOR COMMISSION CONSIDERATION OF STANDARDIZED DESIGNS THAT COULD BE GENERALLY APPROVED IN ADVANCE OF THE RECEIPT OF A SPECIFIC LICENSE APPLICATION. SUBSEQUENTLY, IF A UTILITY PROPOSES TO USE THE APPROVED DESIGN, NO FURTHER REVIEW OF THE DESIGN WOULD BE REQUIRED, EXCEPT TO ASSURE THAT THE CONDITIONS FOR APPROVAL OF THE DESIGN HAVE BEEN COMPLIED WITH AND THAT THE DESIGN IS SUITABLE FOR THE SITE SELECTED.

THE COMMISSION BELIEVES IT IS IMPORTANT FOR CONGRESS FORMALLY TO ENDORSE STANDARDIZATION THROUGH ENACTMENT OF LICENSING REFORM LEGISLATION THAT ENCOURAGES THE USE OF STANDARDIZED DESIGNS. THE USE OF STANDARDIZED DESIGNS OFFERS THE POTENTIAL TO REDUCE TODAY'S LENGTHY CONSTRUCTION TIMES AND COSTS. MORE SIGNIFICANTLY, FROM THE VIEWPOINT OF THE COMMISSION, STANDARDIZATION SHOULD FACILITATE HIGH QUALITY CONSTRUCTION AND SAFE OPERATION OF SPECIFIC PLANT DESIGNS. FOR EXAMPLE, STANDARDIZATION WOULD STIMULATE STANDARDIZED PROGRAMS OF QUALITY CONTROL AND MAKE FOR BETTER, FASTER TRAINING OF OPERATORS AND WORKERS. ALSO EXPERIENCE GAINED FROM ONE OR ANOTHER ASPECT OF OPERATIONS WOULD BE RELEVANT TO THE OPERATING PERSONNEL, EQUIPMENT, AND PROCEDURES OF STANDARDIZED PLANTS WHEREVER THEY ARE LOCATED. EXCHANGES OF INFORMATION BETWEEN UTILITIES WOULD BE MORE VALUABLE. LESSONS LEARNED COULD BE READILY APPLIED TO OTHER PLANTS USING THE SAME STANDARDIZED DESIGNS. IN SUM, STANDARDIZED DESIGNS COULD IMPROVE PLANT SAFETY AND RELIABILITY.

THE PROPOSED LEGISLATION ALSO ADDS NEW SECTIONS INTENDED TO PERMIT THE RESOLUTION OF SITE-SPECIFIC QUESTIONS AT AN EARLY STAGE IN THE LICENSING PROCESS. THE LEGISLATIVE PROPOSALS INCLUDE PROVISIONS WHICH AUTHORIZE THE COMMISSION TO ISSUE A SITE PERMIT EVEN THOUGH NO APPLICATION FOR A CONSTRUCTION PERMIT OR A COMBINED CP/OL HAS BEEN FILED. THESE SECTIONS HAVE BEEN PROPOSED TO FACILITATE EARLY IDENTIFICATION AND RESOLUTION OF SITE ISSUES AFTER GIVING AN OPPORTUNITY FOR PUBLIC PARTICIPATION. SUBSEQUENT FACILITY APPLICATIONS COULD REFERENCE A SITE PERMIT AND FINAL SITE DETERMINATIONS WOULD BE MADE BINDING UNLESS THERE IS A SUBSTANTIAL REASON NOT TO DO SO.

FINALLY, THE LEGISLATIVE PROPOSALS BEFORE CONGRESS WOULD PERMIT THE NRC TO ISSUE A COMBINED CONSTRUCTION PERMIT AND OPERATING LICENSE. THE NRC COULD NOT ADOPT ONE-STEP LICENSING WITH THE

OPPORTUNITIES FOR HEARING AS DEFINED IN THE BILLS WITHOUT LEGISLATION. A ONE-STEP LICENSING PROCESS WOULD ADD FURTHER PREDICTABILITY AND STABILITY TO THE LICENSING PROCESS BY GIVING THE LICENSEE GREATER ASSURANCE THAT IF THE FACILITY IS CONSTRUCTED IN ACCORDANCE WITH THE TERMS OF THE CP/OL LICENSE. THE FACILITY WILL BE PERMITTED TO OPERATE ONCE CONSTRUCTION IS COMPLETE WITHOUT THE POSSIBILITY, AS UNDER THE PRESENT SYSTEM, THAT OPERATION OF A COMPLETED PLANT MAY BE POSTPONED INDEFINITELY SOLELY FOR PROCEDURAL REASONS. UNDER THE CURRENT STATUTORY PROVISIONS, A PUBLIC HEARING MAY NEED TO BE HELD PRIOR TO ISSUANCE OF AN OPERATING LICENSE. UNDER THE LEGISLATIVE PROPOSALS, OPPORTUNITIES FOR PUBLIC PARTICIPATION IN PUBLIC HEARINGS WILL BE FOCUSED ON APPROVALS AT THE BEGINNING OF THE PROCESS, BEFORE CONSTRUCTION IS COMMENCED AND LONG BEFORE ANY SUBSTANTIAL CONSTRUCTION HAS OCCURRED. THE PROPOSALS ALSO PROVIDE THAT CONSTRUCTION QUALITY WILL BE ASSURED THROUGH A PROGRAM OF INSPECTION TESTS AND ANALYSES. THAT PROGRAM WILL BE SPECIFIED IN THE COMBINED CONSTRUCTION PERMIT AND OPERATING LICENSE WHEN IT IS ISSUED, AFTER OPPORTUNITY FOR PUBLIC HEARING.

ALTHOUGH THE NRC AND DOE LEGISLATIVE PROPOSALS ARE QUITE SIMILAR, THERE ARE DIFFERENCES BETWEEN THE TWO PROPOSALS. THE DIFFERENCES BETWEEN THE BILLS ARE SMALL AND THESE DIFFERENCES COULD BE READILY RESOLVED IN COMMITTEE MARKUP. AN EXAMPLE OF THE DIFFERENCES IS THAT, UNDER THE NRC PROPOSAL THE COMBINED CP/OL STANDARDIZED DESIGN LICENSING REFORMS WOULD APPLY ONLY TO LIGHT WATER POWER

REACTORS. DOE WOULD HAVE THE REFORMS NOT ONLY APPLY TO LIGHT WATER POWER REACTORS, BUT ALSO TO APPLICATIONS FOR BREEDER REACTORS AND REPROCESSING PLANTS. BECAUSE THE COMMISSION HAS NOT RECENTLY COMPLETED A REVIEW OF A LICENSE APPLICATION FOR A BREEDER REACTOR OR A REPROCESSING PLANT, WE ARE RELUCTANT, IN THE ABSENCE OF EXPERIENCE, TO RECOMMEND THE STREAMLINED PROCEDURES SET FORTH IN OUR LEGISLATIVE PROPOSAL.

IN CONCLUSION, THE COMMISSION URGES CONGRESS TO ENACT LICENSING REFORM LEGISLATION. ALTHOUGH NO NEW POWER REACTORS HAVE BEEN ORDERED FOR SEVERAL YEARS, THE STATUTORY STRUCTURE FOR THE EXISTING LICENSING PROCESS SHOULD BE CHANGED NOW. THE ONE-STEP LICENSING PROCESS ENVISIONED BY THE BILL CAN ONLY BE BROUGHT ABOUT BY LEGISLATION. THE LICENSING SYSTEM OUGHT NOT TO BE AN UNWARRANTED OBSTACLE TO THE CONTINUED TIMELY AVAILABILITY OF NUCLEAR POWER TO HELP PROVIDE A SHARE OF THE NATIONAL ENERGY MIX WHEN THE NEED FOR NEW GENERATION CAPACITY ARISES.

THIS CONCLUDES THE COMMISSION'S PREPARED STATEMENT, MR. CHAIRMAN. WE APPRECIATE THE OPPORTUNITY TO DISCUSS THESE IMPORTANT MATTERS WITH THE COMMITTEE THIS MORNING AND WILL BE GLAD TO RESPOND TO ANY QUESTIONS YOU MAY HAVE.

Statement of Lando W. Zech, Jr. Commissioner

U.S. Nuclear Regulatory Commission

I think that it is very important for the Congress to consider and pass legislation which would make the needed changes in the two-step system required by existing law for the licensing of nuclear plants. Under the present two-step system, licensing is on the critical path at the beginning of construction as well as prior to operation. A completed plant can be held hostage to the two-step licensing system which has long been characterized by procedural complexities which present a cumbersome and unpredictable licensing path. Issues which appear to have been settled can be raised again and again and the procedural rituals repeat themselves. Although we have gained much operational experience over the past 32 years, the two-step licensing system remains the same. It is an unnecessary obstacle to the implementation of the national policy expressed in the Atomic Energy Act of 1954. Ideally, licensing should be completed prior to construction and should not be on the critical path for operation. The torturous procedural system associated with two-step licensing is a disincentive to any significant innovations, such as standardization, which are needed to reduce the time and therefore the costs of constructing a nuclear power plant and placing it in operation.

S.2073, as well as S.836 and H.R. 1029, contain the basic elements which are needed to change the existing licensing system. Meaningful public participation should be conducted at the outset in the early site approvals, in the approvals of standardized designs and, of course, in the complete licensing review for the issuance of the license for both construction and operation. The public must always be informed candidly and currently on any subsequent developments which could affect the public health and safety.

The full benefits of standardization can be obtained only if there is a combined license which authorizes the construction and operation of the plant. Both standardization and one-step licensing are essential to assure that licensing is removed from the critical path for both construction and operation.

Enactment of legislation with these basic elements -- standardized designs; early site approvals; and a combined license -- would establish a national policy on standardization and thereby send a needed message to the industry--to the utilities, the vendors, the architect-engineers, and the constructors. The NRC is taking steps to update its Standardization Policy, but that does not mean that we can get the whole job done administratively. The NRC has and will use its authority to encourage standardization and will promulgate a policy that includes some regulatory incentives in the near future.

Once a national policy is established and a licensing and regulatory system is in place to implement it, it will be up to the industry and the marketplace to then take the initiative and to select the standardized option they prefer.

Standardization is something that is very much needed, in my judgement, in the nuclear industry in our country. I believe that standardization would bring about improvements in safety, improvements in reliability, and improvements in the economic use of nuclear power in our country. And without going into great detail, let me just quickly enumerate why I think so:

First of all, standardization will allow us to focus on designs that a consensus would agree are excellent designs. It would focus on training and allow us to train people so that they can go from one plant to another.

It will allow us to use lessons learned better than we do now, with so many different utilities and plants involved in it. Lessons learned in standardized plants can be translated quickly, understood quickly, and applied.

It would increase maintenance efficiency because when plants are built the same, as in many other industries in our country, maintenance becomes understood better, practiced better, and works better.

Plants would be operated better. Efficiency of operation is so important. We have fine operators in our country. I've had the opportunity so far to visit 58 different plants in our country. One thing that I've been impressed with is the operators themselves. On the other hand, if the plants were of standardized designs, the operators would, indeed, be able to do an even better job, in my judgment.

Standardization will also contribute to uniformity in regulations such as, for example, standardized and simpler technical specifications and more consistent inspection practices.

And lastly, if the plants were standardized, I'm convinced that we would have more standardized management, more exchange of views throughout the various utilities. Management of the customized plants throughout our country differs now. It is different in the different utilities and in the way they practice their management.

For these reasons, enactment of legislation which eliminates the existing statutory impediments to standardization is clearly needed in our country if the nuclear power option is to survive, which I think it should and must, to be an important part of the energy mix to generate electricity for America's future.

S. 2073 contains the basic changes which are needed to provide a solid statutory foundation for a one-step licensing system which is essential, in my judgment, for substantial progress toward standardized designs.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

OFFICE OF THE
COMMISSIONER

April 17, 1986

The Honorable James A. McClure, Chairman
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

I regret that I will be unable to attend the Committee's April 22, 1986, hearing on nuclear power plant licensing reform proposals due to a long-standing commitment to be away from Washington on that date on official travel. However, I would like to take this opportunity to convey to you and the others members of the Committee my thoughts on this important subject. I request that this letter be included in the Committee's hearing record.

Although I support legislation to bring about the greater use of standardization in nuclear power plant design and to correct the quality assurance, construction and management problems which have occurred in recent years, I cannot support either the Commission's legislative proposal (S.836) or the proposal submitted by the Department of Energy (S.2073) in their present form. In my view, these proposals do not go far enough in requiring the development of complete standardized designs, and they contain seriously flawed provisions which would undermine current safety standards and unreasonably restrict the public's right to participate in licensing proceedings.

The Commission's testimony cites as one of the primary shortcomings of the present licensing system a lack of predictability and stability. I agree. However, I do not agree with all of the reasons given by the Commission for this lack of predictability and stability. In my view, the failures of the past can be attributed to five principal factors. First, the design of the plants has been far from complete at the time that NRC authorized the start of construction. As a consequence, it has been difficult, if not impossible, for NRC to determine whether the proposed plant meets all regulatory requirements. This means that difficult design questions are deferred to be resolved during the construction period, and there is, thus, the potential for hearings on unresolved plant design issues after the plant has been substantially completed. Perhaps most important, the licensee must design the plant as it is being built, an approach that enormously complicates the construction process.

Second, both the NRC and the nuclear industry have made optimistic assumptions about the adequacy of the plant designs and the expected performance of the plants. Actual operating experience has demonstrated that many of these optimistic assumptions are unsupportable. This has led to changing requirements and the need for safety improvements in the plants. For example, assumptions that key safety components in the plant, such as the primary coolant piping system, the steam generators, and electrical cable, would retain their integrity for the full operating life of the plant have proven to be unfounded, and licensees are experiencing severe degradation with some of these components within the first ten years or less of plant operation.

Third, a number of difficult safety issues were deferred not only until the construction period, but also beyond the start of plant operation because requiring a resolution of the issues would have delayed licensing. As a result, there is a backlog of generic and unresolved issues that must be addressed to provide adequate assurance of safety for the remaining operating lives of the existing plants.

Fourth, some utilities have failed to meet their licensing commitments and NRC regulations. This is particularly evident in the plants that have experienced construction quality assurance breakdowns in recent years. Where the licensee cannot demonstrate that the plant has been built in conformity with its license and NRC regulations the result is a costly and time-consuming corrective program to verify the safety of the as-built plant.

Finally, the NRC has failed to pay sufficient attention to factors that can significantly influence whether the utility meets its license commitments and NRC regulations. Perhaps the most important of these factors is the experience and competence of the licensee's construction management team. Despite what the industry characterizes as an overly detailed and prescriptive set of regulatory requirements, the NRC has not set standards for license management and has not insisted that the utility applicant have in place an experienced and competent management team before authorizing the start of plant construction. Nor has the NRC always been effective in identifying quality assurance breakdowns early in the construction process. Although the two-step licensing process may have been a contributing factor in these past failures, the principal fault lies with the Commission's reactive approach to safety regulation. Unfortunately, neither S.836 nor S.2073 include provisions to address these weaknesses in the Commission's approach to safety. My concerns about the Commission and DOE legislative proposals are described in greater detail below.

Under the Commission's 1983 legislative proposal, which I supported, the provision allowing for the issuance of a combined construction permit and operating license (CP/OL) required the application to contain "sufficient information to support the issuance of both a construction permit and an operating license" in accordance with NRC regulations. The Commission's current legislative proposal (S.836) has watered this down to require submission merely of "sufficient information to support issuance of a combined construction permit and operating license." The Commission has not explained why a combined CP/OL should require less information than the separately issued CP and OL.

The difficulties presented by this lowered standard are aggravated by the Commission's decision to delete the requirement in our previous bill for a preoperational review of the adequacy of a plant's construction, its readiness for operation, and the sufficiency of the emergency planning measures. The Commission has also declined to commit itself to preoperational reviews of significant safety issues not previously considered. The Commission argues that the inspections, tests, analyses, and acceptance criteria specified in the combined CP/OL will assure the proper construction of the plant and its readiness for operation. This ignores our unfortunate experiences in recent years with the unforseen safety problems and with construction projects which have run into difficulties and have, in some cases, been cancelled.

The Commission would have done better to stick with its 1983 proposal which required it to make a formal finding that construction had been completed and that the plant would operate in conformity with the combined CP/OL, the Atomic Energy Act and the NRC's regulations. It is worth noting that in 1983 the Commission recommended that it be required to conduct a supplemental review, prior to the commencement of operation, of any issues that were not considered in prior reviews of the facility. I see no basis to support the Commission's change in position on this important safety requirement. The DOE bill also suffers from this failure to require preoperational reviews of key safety issues by the NRC.

The Commission's 1985 bill would place a very high threshold on the ability of a member of the public to obtain a hearing after the issuance of the combined CP/OL. In order to designate an issue for a hearing the Commission would have to find that (a) the issue consists of a substantial dispute of fact, (b) resolution of the issue is necessary for the Commission's decision, (c) the issue cannot be resolved with sufficient accuracy except at a hearing, and (d) either (i) the issue was not and could not have been raised and resolved in any prior proceeding for that facility, or (ii) that (1) there has been a nonconformance with the license, (2) such nonconformance has not been corrected, and (3) such nonconformance could materially and adversely affect the safe operation of the plant. The DOE bill imposes a similarly high threshhold for public hearings and would expressly allow plant startup prior to the completion of hearings on significant safety issues. As a practical matter, this thicket of obstacles will make it impossible for people living close to a plant to obtain a hearing on the issues such as emergency planning, adequacy of plant construction and readiness for operation, which are of greatest concern to them. I am opposed to these new obstacles to state and public participation in our licensing proceedings. I believe that the smooth operation of the licensing system does not require the public's hearing rights to be artificially restricted. Indeed, I am persuaded that the efforts by the Commission and DOE to silence the public will only stimulate opposition to future nuclear power plants.

In addition, I would point out that the combined CP/OL, early site review, and standardized design provisions of the bills contain a statutory limitation on backfitting. Putting aside my reservations about the wisdom of the Commission's proposed backfitting standard (conditioning a backfit on a showing that it will substantially advance public health and safety by improving overall plant safety), I recommend that the Congress not enact these provisions. As the Commission itself noted when it submitted its 1983 proposal, this is a problem which can be better addressed in the Commission's regulations. The Commission has had relatively little experience with formal backfitting standards. If this formulation turns out to be unworkable and detrimental to safety, the regulations could be modified relatively easily. A statute would be far more difficult to amend. Indeed, the Commission's recent experience with its new backfit rule is already disclosing some serious difficulties with the rule. For example, the backfit rule as presently formulated may make it impossible for the NRC to require improvements in the ability of U.S. plants to survive a loss of AC power for emergency systems (station blackout) despite the fact that the NRC staff and other countries view this as one of the most important unresolved safety issues. Similarly, the Commission may well be foreclosed by the backfit rule from bringing its radiological protection regulations into conformity with current technical knowledge and accepted international standards, and from adopting any new requirements in the important areas of human performance. The DOE bill would freeze by statute these questionable provisions of the Commission's current backfit rule.

For the foregoing reasons, the Commission and DOE proposals should be redrafted (1) to ensure that plants with combined CP/OL's meet the same safety standards as plants licensed under the present regulatory scheme, and (2) to afford interested states and members of the public an opportunity for a hearing prior to plant operation on issues such as emergency planning, adequacy of plant construction and readiness for operation. In addition, I believe that a licensing and standardization bill should include other provisions not found in the Commission and DOE proposals to bring about the greater use of improved standardized designs and to address some of the construction and quality assurance problems which have been identified in recent years. To that end, I would recommend adding provisions to the bill to require that future nuclear power plant applications use essentially complete standardized plant designs which incorporate as key design elements greater simplicity, larger margins of safety, and other characteristics that promote more efficient construction, operation, maintenance and reliability. Further, the bill should require that any future design or plant application satisfactorily resolve all existing safety questions, including the unresolved and generic issues prior to the issuance of a design approval or authorization of construction. I would also recommend requiring that future plant applications use a centralized management approach for the construction project with specified check points to assure adequate quality as construction proceeds. Finally, I would require that the NRC develop standards for utility management and that the utility applicant demonstrate that it has an experienced and competent management team in place before the NRC approves the start of construction. Such provisions would do much, in my view, to correct the mistakes of the past.

I hope that these comments are helpful to you and the other members of the Committee.

Sincerely,

James K. Asselstine

James K. Asselstine

cc: Senator J. Bennett Johnston

The CHAIRMAN. Thank you very much. I note that Commissioner Zech has a statement appended. Mr. Zech, would you care to summarize or highlight that statement at this point?

Mr. ZECH. Thank you, Mr. Chairman. I would appreciate putting the statement in the record, if I may, and briefly make just a couple of comments.

The CHAIRMAN. Surely.

STATEMENT OF LANDO W. ZECH, JR., COMMISSIONER, NUCLEAR REGULATORY COMMISSION

Mr. ZECH. Mr. Chairman, recently I toured some nuclear powerplants in England, Belgium, France, and Germany for the first time. I just got back a few days ago. Before I made this trip I visited 58 plants in our own country. I was convinced after visiting our own plants that standardization of nuclear powerplant designs is a critical factor in our country for the future of nuclear power, not only for the future of nuclear power in the United States but especially for the improvement of safety and reliability of future nuclear powerplants in our country.

So now that I have had an opportunity to review standardization as put in practice in Europe, I am even more firmly convinced that it is absolutely necessary for our country to move forward into standardized designs and move forward into nuclear power improvements in safety and reliability in our country.

However, the full benefits of standardization, in my view, can only be obtained if there is a combined license, that is a single license, one license which authorizes both the construction and the operation of the nuclear powerplant.

Our current law, as you know, Mr. Chairman, requires a two-step licensing system, that is a license for construction and a separate license for operation. The current law has been in existence for over 30 years. When it went into effect it was probably most appropriate. In my view, at this stage, some 30 years later, current law needs to be changed.

I think that both standardization and single stage licensing as well as early site approvals will result in improved safety and reliability of our nuclear plant operations in the United States. This legislation provides for these essential elements. The legislation is needed, Mr. Chairman, and I strongly suggest that it should be enacted.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much. There is one concern perhaps that I will put right up front because it has been referred to two or three times and I would like to move to it very directly. That is the question of what do you do if during construction after a license has been issued your examination of the operations of other plants indicate a safety problem?

If you have an initial license that covers the construction of a plant, you get into the question immediately of what backfit is required, what change in design. You cannot give an absolute assurance at the beginning of construction that there would be no changes required for the plant that is operating.

I suppose the temptation in each of those instances is if you can identify any kind of safety problem at all, you are going to require a change in the design or operating parameters of that plant. Surely there are those which are such marginal considerations that you do not really need to incorporate the new design by retrofit in all existing plants. Yet, I suppose it is very difficult for you to say that it is important enough to order a change in design but not important enough to order a retrofit.

How do you deal with that kind of a question when it has been identified so clearly that backfitting is a major problem?

Mr. **Palladino**. Mr. Chairman, let me divide the answer into two parts, and let me then talk about the situation that would apply if legislation were enacted as proposed.

Under the situation existing when I first became Chairman, I found there were so many ways to have backfitting imposed by the Commission that I felt, and the Commission concurred, that we needed to take some steps to control that process.

We immediately set up a procedure whereby we used a committee to review generic requirements. Those are requirements that are placed on more than one plant. In that process we required that, unless it was absolutely essential to our finding of adequate protection of public health and safety, new requirements would have to be justified on the basis of the cost effectiveness.

We have further introduced and are now operating with a rule that applies this standard also to specific plants. However, under the proposed legislation the criteria would change in that the backfit would be imposed only if it was essential to the finding that the public is adequately protected.

Let me say that if at anytime during the process we find items of noncompliance or we find new safety issues that we have not identified in this particular design, they would be corrected.

The **Chairman**. Mr. Bernthal.

Mr. **Bernthal**. Mr. Chairman, if I could comment on that point briefly, and if I may also ask the permission of the committee, I would like to submit for the record later on some comments on a few points. One of them is related to this issue.

The **Chairman**. They will be made a part of the record.

STATEMENT OF FREDERICK M. BERNTHAL, COMMISSIONER, NUCLEAR REGULATORY COMMISSION

Mr. **Bernthal**. Some of these points I am sure could have been resolved, perhaps with consensus among the members of the Commission, but thanks to the fact that we are not able to speak to each other in these circumstances, the public and this committee is deprived of that contribution.

I have a concern, quite frankly, and am troubled by the sections of S. 836 that deal with backfits. In particular those sections direct that before a facility modification can be required, the Commission must determine, based on significant new information, that the proposed modification, and I am quoting from the language in the bill, "is required to protect the public health and safety," and this is the important point, "the modification will substantially enhance the public health and safety."

Now on its surface that may not seem to pose a problem, but I am troubled by that language for several reasons. Suffice it to say, though, that that language is susceptible to many readings. I do not think any of those readings are satisfactory.

Moreover, the proposed legislation was not, I am sure we all agree, intended to be inconsistent with the NRC backfit rule that we recently promulgated. The fact remains that no reading of the backfit language in this bill is consistent with that rule that we recently promulgated. Under that rule, and here is the key point, if a modification is required to protect public health and safety, it is by definition not a backfit. That is the key point.

Backfits are modifications, under the rule, which go beyond the measures required for that minimum acceptable threshold for protection of public health and safety. Thus, I suspect that you could read the language that I have quoted as mandating that no backfits, as defined in the NRC's own rule, would ever be permitted so long as the Commission could reasonably adjudge, as do we currently, that that minimum protection is provided.

So I think Congress and this committee should be mindful of some of these problems in language that exist in the current bill.

[The prepared statement of Mr. Bernthal follows:]

Record Comments of

COMMISSIONER FREDERICK M. BERNTHAL
U.S. Nuclear Regulatory Commission

Hearing before the

SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

APRIL 22, 1986

As Chairman Palladino indicated in his statement, S.1073 and the NRC bill, S.836, are similar and consistent in virtually all major respects, and I support the essential features of both bills.

A few aspects of the proposed legislation warrant further comment, however. First, it should be noted that a majority of the Commission has agreed that the last sentence of proposed Section 185(b) of S. 836 should be modified. As originally submitted to Congress, that section provided that facility operation should commence based upon the combined construction permit and operating license "unless the Commission determines that good cause exists for delaying such operation."

Such language would have made final approval of facility operation a matter of mere "negative consent" by the Commission. A majority of the Commission has therefore agreed that the last sentence of Section 185(b) should instead read:

> "Prior to commencement of operation, the Commission shall determine, based upon the requisite program of inspections, tests and analyses, whether construction has been completed in conformance with the combined construction permit and operating license and consistent with the regulations of the Commission."

This alternative language simply commits the Commission to make a formal, affirmative finding that the NRC has done its job properly before allowing a powerplant to begin operation, thus foreclosing the possibility of initial plant operation on "procedural autopilot", as it were.

The second item deserving comment involves hearing rights at the latter stages of the licensing process. Last year, Senator Simpson queried the Commission about the S.836 provision for requests for hearings prior to commencement of facility operation. Section 185(b) requires that, before the Commission may designate an issue for hearing at an advanced stage of the licensing process, it must find that the issue:

> "...consists of a substantial dispute of fact, necessary for the Commission's decision, that cannot be resolved with sufficient accuracy except at a hearing...." [emphasis added]

Interestingly, the quoted language did not originate with either the NRC or DOE bill. Almost identical language can be found in Section 134(b) of the Nuclear Waste Policy Act passed by the Congress in 1982, the section which deals with hearing procedures for spent fuel pool expansions and transshipments.

I have concluded that the underscored language should be deleted from the Bill now before the Committee. The deletion would erase the nagging concern that the Commission, after all, would be free to decide that any issue could be determined with sufficient accuracy in lieu of a hearing.

Whether or not such determinations might in principle be possible outside the context of a hearing, the other requisite findings specified in Section 185(b) are sufficient by themselves to assure that only significant issues which could not have been raised previously are considered for litigation late in the game.

A third noteworthy point: Various sections of S.836 dealing with backfits direct that before a facility modification may be required, the Commission must determine, based upon significant new information, that the proposed modification "is required to protect the public health and safety...." and that "the modification will substantially enhance the public health and safety...."

I am troubled by the quoted language in the various sections of S.836. Suffice it to say that this language is susceptible to several readings -- none of them satisfactory, in my view. Moreover, while the proposed legislation was not, I believe, intended to be inconsistent with the NRC Backfit Rule, the fact remains that no reading of the "backfit" language in S.836 is consistent with the NRC's recently promulgated rule.

Under the NRC Backfit Rule, if a modification is required to protect public health and safety, it is by definition not a backfit. Backfits are those modifications which go beyond measures required for minimum acceptable protection of public health and safety. Thus, one could read the above language as mandating that no backfits, as defined in the NRC's own rule, would ever be permitted. Other equally unsettling readings of the "backfit" provisions of S.836 are possible.

Such readings are clearly contrary to the philosophy of the Commission's Backfit Rule, which adopts as fundamental the premise that substantial cost beneficial improvements are possible, notwithstanding the fact that there may be no undue risk to the public absent the proposed modification. (To illustrate, while it may be commonly agreed that air travel poses "no undue risk", an inexpensive modification that promised to reduce the number of commercial aviation accidents by ten times would surely be quickly adopted and roundly applauded.)

Noteworthy in its absence from S.836 is any requirement, prior to approving modifications to facilities, that the Commission consider the central and dispositive criterion of its new Backfit Rule: the relative costs and benefits of imposing such modifications. Congress should be mindful of these problems in language and definition.

Finally, I note that the backfitting provisions in S.2073, while presented in a more organized and logical manner than those in S.836, would set in statute the same trap which has ensnared the Commission ever since the recent promulgation of its Backfit Rule. Specifically, as I read the bill, the provisions in S.2073 would require the backfit provisions to be applied to virtually all Commission rulemaking.

It now seems clear that similar broad application of the Backfit Rule to Commission rulemaking (never the original intent of the Rule) has severely impaired the Commission's ability to promulgate its rules in an orderly, disciplined manner. Already, several different rules, totally unrelated to "backfitting" as that term is intended or commonly understood, have been subjected to tortuous consideration of whether "backfit" analysis was required and if so, whether the proposed rules could pass muster on a strict (and often inappropriate) cost-benefit basis. The consequence has been a Commission seeking a mechanism whereby it may pick and choose to which rules the Backfit Rule requirements shall apply and to which they shall not apply.

I fear that as long as the Commission continues to apply the Backfit Rule to rulemaking itself (in effect contravening the time-tested provisions of the Administrative Procedures Act), licensees can look forward to new dimensions in regulatory uncertainty when it comes to Commission rulemaking. It would be troubling indeed to see this error compounded in legislation.

All of the above considered, however, I wish to reemphasize that the proposed legislation, with certain appropriate adjustments, will provide an essential and timely statement by the Congress -- a statement that will illuminate the path to the next generation of standardized nuclear powerplant construction in our country. I strongly support the leadership and efforts of this Committee in that endeavor.

The CHAIRMAN. I appreciate that comment, but I still wonder if indeed you can identify a change in construction or operation that enhances the public safety. If there is a threshold test that can be applied that says yes, we will do that in the future but we are not going to require a change for those that are already built and operating or those that are in the process of construction, are those not gradations?

If they are not gradations, are you not then almost in the position where if you can identify the slightest change that has the slightest benefit for safety, you are going to be obligated to order the backfit or the change for all existing and operating plants for those that are in any stage of the construction at all?

Mr. PALLADINO. Mr. Chairman, under our new rule we make cost benefit analyses, and in one case with the plant essentially built, the cost benefit analysis could be quite different from the cost benefit analysis for a new plant.

So I am saying we could take that into account.

The CHAIRMAN. Is that possible under either of the bills that are before us?

Mr. ZECH. My view, Mr. Chairman, is either of the bills before us is entirely appropriate, and there is no problem at all. I do not have the same concerns as my fellow commissioner has on that, and it is a matter of interpretation. I would agree with that.

On the other hand, what we are trying to do if we standardize is to get an essentially completed design. We are starting our plants now with designs that are between 15 and 20 percent completed. We are trying to change that. The designs, in my judgment, should be 85 to 90 percent completed, if possible, or even more.

When you start, therefore, with that thorough a review, thorough analysis, complete confidence in the design, your chances of having to make any significant changes are very small. So it is discipline that our system needs, and that is what we are talking about, discipline in the NRC process as well as discipline in the design process.

So I agree with your talk on gradations. I think those are decisions that can be made certainly during the course of construction. We learn something new. We find the design is deficient. We should change it. My view is that we have all the authority in the world to do just exactly that. We simply do not need another formalized adjudicatory hearing, going through the examinations and cross-examinations and all that business.

We can make those decisions in a very businesslike and thoughtful manner without having to go through another formal licensing process. Those are things that have been in other industries all the time, and I think that is a matter of responsible judgment for which these bills provide. I have absolutely no problem with the language in the bills at all.

Mr. PALLADINO. Mr. Chairman, may I make one suggestion with regard to the bills? Both bills prescribe a backfitting procedure, but we have already have a backfitting procedure for the existing plants. I would urge that the legislation indicate that the new backfit procedures apply to the standardized plants, the plants that are essentially completely designed, and let the present process which has been carefully developed apply to the existing designs.

The **Chairman**. Mr. Bernthal.

Mr. **Bernthal**. Mr. Chairman, I think the chairman has correctly identified the key to the way one deals with this question of gradations. When does a backfit proposal meet the requirement that even though minimal public health and safety protection may be satisfied, it may nevertheless be worthwhile? That key is cost benefit, and that is the essential feature of the Commission's backfit rule.

I do not disagree with Commissioner Zech that the language, as it stands, could be read to permit that kind of analysis, but it is not there. I think that one ought to be concerned about the way the language currently reads.

The **Chairman**. Do I understand you correctly? Let me paraphrase it to make sure that I understand what you are saying. While it would permit what you described, it is not a requirement.

Mr. **Bernthal**. That is correct. It is striking, in fact, that that key element, the underlying philosophy that drives the Commission's backfit rule, cost-benefit analysis, is absent from this bill. I think it ought to be looked at very carefully, and the chairman's suggestion is one way to go.

The **Chairman**. Under the current NRC licensing process, why could not a utility order a Palo Verde type plant and be assured of a fairly simplestraightforward licensing process as compared to a first-of-a-kind plant?

Mr. **Palladino**. Mr. Chairman, if a utility were to say he wants a Palo Verde type plant, it would be a new application. We would be required to review it. Now, the review may take advantage of past reviews, but the Commission would still be free in the process to decide they want to add something to that particular design.

The **Chairman**. You are not, however, required to. If, as a matter of fact, you have one that has already been approved and is operating, why can you not just kind of stamp an approval on the next one if it is precisely the same?

Mr. **Palladino**. The way our procedures work, it would have to undergo a review to make sure.

The **Chairman**. Why can you not change that procedure by administration regulation?

Mr. **Palladino**. I presume we can but I find that unless the plants are identical, there may be slight features that apply to the one plant that do not apply to the other. We find that the balance of plant does influence the safety of the plants.

The **Chairman**. A site review would be true under the standardization permitted under either of the bills before us—not only permitted but required.

Mr. **Palladino**. The review probably would be more thorough in the case of a standard design than it would for a particular design.

The **Chairman**. Why? Are you telling me the plants you have in operation now are subject to less than thorough review?

Mr. **Palladino**. No; I did not say it was less than thorough review.

The **Chairman**. Then why would a standardized design have a more thorough review?

Mr. **Palladino**. It would get into some of the generic and unresolved safety issues that we anticipate would be part of the standard design.

The **Chairman**. You already have a backlog of such unresolved safety issues, I think some 40-odd such issues before you.

Mr. **Bernthal**. Mr. Chairman, your question about why the Commission cannot even now essentially take the Palo Verde design and translate it to another site is a good one. I listen to counsel on these matters, and I am informed by counsel that the reason for that failure under the current regime is a legal one. The parties that have standing for the Palo Verde proceeding do not have standing for a plant at another site and therefore would not have been permitted to litigate whatever issues they saw if that specific design were translated to another site.

In the standardization legislation, all essential features that are not site specific would have been litigated in advance before the Commission approves the standardized design.

The **Chairman**. Then the reason you cannot do it now is you cannot permit all parties to come in, and therefore they do not have standing and thus it has not been litigated and you cannot do it?

Mr. **Bernthal**. That is my understanding of the way it works right now, yes, sir.

The **Chairman**. Let us have just one big hearing, is that the idea?

Mr. **Bernthal**. That is essentially what we are proposing.

The **Chairman**. You have been having one big hearing for 20 years.

[Laughter.]

Mr. **Bernthal**. This is going to be smaller than that, I hope.

Mr. **Zech**. Mr. Chairman, if I may add to that, I view your question on the Palo Verde or replication- or duplication-type possibility as in a special category. If we think those are satisfactorily designed plants and they are operating reliably and safely, I see no reason why we shoul not be able to accommodate other requests for a design along the same line.

On the other hand, on standardization I think we are trying to go a step further. We are trying to put in our several-accident policy and some things like that.

In my view on standardization, I look at the first generation of standardized plants, and at least as I see it, they would be something that are perhaps out there right now. There may be some modifications to the plant, but it would be a plant that we feel is safe and reliable and that we have great confidence in.

The plants are out there now. Many of them, especially the newer ones, are operating very well and doing very well, and certainly we should have confidence that that kind of a design could be approved as a standard design with certain minor modifications.

Then, as earlier discussed today, naturally as soon as you get a standardized design, they should go through the process and have the stamp of approval of something that could be used for a number of years. I do not think you should have one standardized design, but three, or four, or maybe more than that. Then we will have all kinds of new ideas. They happen every day. The designers, the manufacturers, and others have good thoughts. Those, in my view, should be put on the shelf, if you will, and be considered as the second generation.

Unless the design is considered unsafe, we should continue to operate the plants as origninally approved as the standardized design, ever being mindful that our job is public health and safety. We should always be mindful of safety. Unless we are convinced that the plants are not safe, we should continue to operate them in a safe manner and make sure that the second generation use advanced reactor designs or whatever.

So that is the thought process I use. An exception, if you will, for replication and duplication of plants like Palo Verde and SNUPPS and others, but the first generation would be something we have confidence in, would be generally accepted, as Mr. Herrington said, and would be suggested perhaps by the industry themselves. We would let them submit their plans to us, and then the second generation would be more along the line of advanced reactors.

That is the kind of thinking that I think we should be involved in when we are talking standardization.

Mr. PALLADINO. Mr. Chairman, our deputy general counsel feels that he has some comments that would help on this question of the Palo Verde Plant being replicated at another site.

The CHAIRMAN. Would you identify yourself for the record?

Mr. MALSCH. I am Martin Malsch, The Commission's Deputy General Counsel.

If one were to propose using Palo Verde's at a different site, one would have to treat differently the generic design aspects from the particular specific siting aspects insofar as siting issues are concerned at a new site.

The CHAIRMAN. That is true under the proposed legislation as well.

Mr. MALSCH. That is correct. The parties who are newly affected by the proposal at that site would have a chance to contest it.

The CHAIRMAN. At that site?

Mr. MALSCH. That is correct. They would have a chance to contest the suitability of that site in a particular licensing proceeding.

The CHAIRMAN. That has nothing to do with generic design.

Mr. MALSCH. That is true.

Senator EVANS. Mr. Chairman, could I interrupt at that point? Is that true under current law, or would a person with new standing have an opportunity to raise questions that had been raised at another site on issues that were not necessarily site specific but were issues of interest to that new party that they previously had not had a chance to raise?

Mr. MALSCH. That would depend upon generic nonsite specific issues. It is possible that the Commission could approve a design in a rulemaking proceeding in which all interested persons participated, and after that the approval would be fixed and would not be susceptible to litigation.

Senator EVANS. I am following through on the Chairman's question. That has apparently not been the case with the Palo Verde.

Mr. MALSCH. That has not been the case with the reactor designs thus far.

Senator **Evans**. I understand. What I am asking is if this carbon copy of Palo Verde at another site were under current law to be authorized, would a new party with standing now that did not have standing in the other issue be able to raise generic nonsite specific questions?

Mr. **Malsch**. Yes; he would, and one of the advantages of generic site approvals under the legislation is that you approve the design once and for all, and there is not this review and relitigation on a specific basis.

The **Chairman**. Now as a matter of fact, could not the Commission today start such a generic licensing hearing and process and open it to all parties to come in and question that design and then put that standard design on the shelf, leaving, of course, the site specific questions and the impact of the specific sites and the standing of parties to question that in the further proceedings?

In other words, can the Commission now do what the legislation says should be done?

Mr. **Malsch**. At least to that extent it can. Now other aspects of the legislation require new law, but in terms of that particular aspect of it, that could be done under present authority.

The **Chairman**. Then my question to the Commission would be why have you not done it?

Mr. **Palladino**. Mr. Chairman, there have been efforts to do that. Several standardized designs are going through the process, but it depends on the interests of the suppliers. The designs have not been complete design in all instances, however. They have been more nuclear island designs, and while some people think that is enough, I for one do not. I find many of the problems with our plants relate to the interaction of the balance of the plant with the nuclear steam supply system.

Mr. **Bernthal**. Mr. Chairman, I believe the short answer is that nobody has really asked; that is, nobody has decided to put the money on the table to go through that lengthy, perhaps excruciating, process in this climate today in particular, to get what the Commission would view as that final design certification as we call it.

The **Chairman**. As a matter of fact, the industry has been moving in the other direction, but they want to preserve the right for new and original designs on almost every plant. Perhaps they have not had the appropriate incentive, or perhaps their clients, those who buy the plants, have not been sufficiently of one mind to avoid the pitfall of individual designs.

I have already taken more than my share of the time. I have a number of other questions. I have a generalized comment, however

It seems to me that part of the problem may be on a part of the utilities. Part may be also on the part of the Commission itself. I suspect from our perspective, and it is somewhat detached up here, that you are up to some depth in the swamp filled with alligators and you do not necessarily have all of the detached time to respond to the more philosophical questions.

You are so busy trying to answer specific questions, and maybe you need some help from us in directing your attention toward some of those larger questions that you otherwise simply do not have time to get around to.

With that, let me yield first to Senator Domenici if there are no objections. I understand he has to leave immediately.

Senator DOMENICI. I am not going to take much time. I was just intrigued with the questions.

I assume that, absent some approval of the type the chairman and the Commission were just involved in, clearly under current law and current practices if somebody just tried to substitute a plan, there is no assurance at all that it would take any less time than it does now. Is that a fair statement?

Mr. PALLADINO. If there were a complete design, I think after the plant is approved it could take less time to construct, and I think the experience at St. Lucie, unit 2, shows that the experience of having built one can shorten the time needed to build a second one.

Senator DOMENICI. Absent the construction-enhanced time schedule, is it a fair statement that procedurally for those who insisted upon hearings and litigation, there is nothing in the current law or regulations that would change that timeframe. If somebody came in with a previous plant and said I would like to build one just like it, they have all the same remedies and all the same court approaches Even though it has all been done once, they have it all over again. Is that true?

Mr. ZECH. You see, that is the essential problem, Senator Domenici. That is the most important part in the legislative package. We need to have a single stage licensing review process. You are absolutely right. Once the construction permit is granted now, the process can indeed start all over again before the plant is authorized to operate after it is almost fully constructed or perhaps fully constructed.

So an essential part of the legislative package is to get this change in the law. It is necessary that the law is changed to go to one stage.

Senator DOMENICI. I understand that. Let me just say that I had assumed, as this discussion ensued, about holding a plant that has just recently been constructed, and some of you were coming in and asking that a similar one exactly identical be moved on through.

I had assumed that they were reluctant to do that because there was no assurance that that would save any procedural time, but I also assumed that even though you were in a swamp, as the chairman has indicated, and trying to do normal business, that there is no assurance that even if you try to go with some approved plan you would have to have somebody try that.

There is no assurance flowing to them that they would get through the situation that they are now confronted with any easier. Is that a fair statement?

Mr. PALLADINO. I think you are right on that, and particularly they would not have the benefit of the one-step license which I think is very important to them.

Mr. BERNTHAL. Senator Domenici, I think with respect to the rights of the parties and this problem of the litigation that we have discussed, your worst fears are by and large confirmed. It is worth noting, however, that from the standpoint of our technical review and our staff's review, it goes without saying that there is great benefit even today to proposing a plant that is essentially the same design as an earlier plant.

The CHAIRMAN. In other words, you could answer the questions faster even though the new parties to the proceedings might raise the same question?

Mr. BERNTHAL. That is exactly right.

The CHAIRMAN. Or even different questions about that design?

Mr. BERNTHAL. Yes, sir.

Senator DOMENICI. I had only one question for the Admiral. You said you visited a number of plants here and then went to Japan and France, and so you are aware of the contrast in the time it takes and the processes and procedures.

Mr. ZECH. Yes, sir.

Senator DOMENICI. Were you able to ascertain whether the findings in the Booz-Allen & Hamilton study which indicated, as I understand it, that about 70 percent of the plant escalation costs in this country since 1973 could be directly attributed to the regulatory structure?

In contrast, were you able to determine whether, under their processes, there was less of an acceleration and escalation in costs from initiation to completion?

Mr. ZECH. To answer your question, I am not sure about the 70 percent, Senator. I would think that is very debatable, but there is no question about the fact that in Europe they have a much more predictable and stable licensing process. They can focus their attention on building the plant and building it responsibly, whereas we have a much more procedurally oriented process, and that does make a big difference.

Senator DOMENICI. My question is more specific. Obviously when you take less time, the degrees of interest rates and the like, you obviously are apt to cause less acceleration and escalation of cost. Using the relativeness of 6 years versus 12, however, are their costs more predictable than ours, even during these inflationary times?

Mr. ZECH. I am not so sure about their costs, Senator, because costs overtime naturally can be influenced by higher inflation. I think the thing is that when they start building their plants, they have a pretty good idea right from the beginning how long it is going to take to build them. We do not do that in our country.

We have this two-stage process that does allow procedural interferences, and therefore there is no real predictability in our system. In their system, my sense was that there is a fair amount of confidence that when they start a plant they can make a pretty good estimate not only of costs but of the time to build the plant, and they actually build them faster—and build the plants very well.

We should be able to do that. There is no reason in our country that we shouldn't be able to do it, or do it better, in my judgment.

Senator DOMENICI. Mr. Chairman, I wonder if you would think—I really want your judgment on this—if it would be worthwile for this record, and if you do not, I would ask for it personally, just because I really am confounded by the time it takes. I wonder if it would be appropriate to ask maybe three typical licensing processes, and let them submit them for the record, and just go through the steps as to what it has taken in time from the initial application until the final construction, just for us to see a flowsheet of where 3 years went, where 2 years went, where 1 year went, how much was real construction.

Senator **Ford**. Mr. Chairman, may I interject here, too? We have all been kind of bouncing around something that I am interested in, and if we could add this to Senator Domenici's question about the scenario of two or three normal plants, then could they cite two or three examples of nuclear powerplants that have been completed on time and on budget, and then to give your opinion of why they were built on time and on budget. If we could get that, I think we are beginning to get your opinion on why those plants made the budget and why they made the time period.

The **Chairman**. I would ask that you respond in that fashion if you can, and I would anticipate that there may be individual opinions from individual Commissioners and expand that question to be addressed to the Commission generally and to each of the Commissioners specifically if there are differences of opinion or different viewpoints.

Mr. **Palladino**. Mr. Chairman, it is going to take quite a bit of work to develop the scenario for the length of time. Are you asking us to do it, or do you want us to ask some of the utilities to do it? It depends upon the flavor that you would like to see.

The **Chairman**. Well, I think it would be from the standpoint of the Commission at this point, what your history has been and how you view that history.

Mr. **Palladino**. For two or three plants, I gather.

The **Chairman**. Yes, I think that would be extremely relevant, and I have prepared some other questions that I will submit to go along that line, but this fleshes it out a little further.

Mr. **Palladino**. May I make one comment with regard to the comparison of foreign and domestic approaches? Particularly in France, they had the benefit of all of the experience we have gained up to the time they started, and so they had a little bit of hindsight, so to speak, and also in some of the countries, and now I am switching to Japan, they had early experiences where they weren't able to do as well as they would like to have done it, but because of their organizational structure, they were able to take steps to reduce the number of scrams to better coordinate the outages, and so they have had a learning experience, but the important point is that they have learned from that experience and apparently we have not, and this is why I would like to see this legislation passed.

The **Chairman**. And that is part of what we are looking at, is to try to determine why we have not learned, or indeed if we have learned, why we have not applied what we have learned, and I think those are two different things, and finally, what laws need to be changed in order to be able to apply what we have learned. Mr. Bernthal.

Mr. **Bernthal**. Mr. Chairman, if I could say, the legislation that you have proposed here contains the key element, I think, as Commissioner Zech and others have noted, standardization. That is going to go a long, long way toward solving this problem. One need not look any farther than a single rather shocking statistic of what has happened in this country over the last 20 years to understand that there could never have been predictability in this process in principle. We have 60 aspiring nuclear utilities in this country, 60. I do not know exactly how many times that is the rest of the world combined, but it is probably at least two, and probably three. Sixty utilities building nuclear powerplants for better or worse the way they wanted to, architect engineers who are a diverse group in themselves involved in that process, and then four reactor nuclear steam supply system vendors. I think the message is pretty clear from those numbers.

The CHAIRMAN. Well, is it not possible even with those numbers to allow innovation and new designs, but to array against that the possibility of a standardized design, and allow the different utilities and vendors to choose between the routes they would follow one way or the other and make a technical and economic choice as to which route they wanted to go?

Mr. BERNTHAL. Absolutely. I think in most cases the choice would be clear that they would go the path of standardization if that option were made as it is in the suggested legislation.

Mr. ZECH. They should definitely have that opportunity, Mr. Chairman, to choose from the type of plants they think will benefit their locality, their community. They should definitely have that opportunity, and I believe that the legislation as proposed would allow that to come about.

The CHAIRMAN. I would invite you to submit whatever additional statements you would like to make that was not covered by the prepared statement that flows from or out of the questioning that you have gotten here today, because we are seeking answers, and obviously we want to be helpful to the process. We also do not want to pass a piece of legislation that in itself does not answer the questions or that needs to be revised further in the light of experience under that legislation if we can avoid it, because it is obvious it takes a long time between legislative actions, and I do not want to encourage people to get such a piece of legislation on the books that will invite almost immediate revision.

I, on the other hand, do not want it to be so broad that it invites immediate litigation.

Mr. PALLADINO. Mr. Chairman, there are two bills we tend to think of, the one S. 836 and the other S. 2073. Would you like it on both of them, or just on S. 2073?

The CHAIRMAN. I think we would like it on both of them, because—or any other variation on the theme.

Mr. PALLADINO. The comments may be slightly different.

The CHAIRMAN. We just want to get good legislation. We do not want a specific legislative approach.

Senator Evans.

Senator EVANS. Mr. Chairman, after listening to this dialog this morning, I guess I have got to ask one fundamental question of each of you, and I hope for a yes or no answer.

Would you prefer and do you believe you would be better off in carrying out the responsibilities of the Commission if you were head of a single management agency a la EPA? And let us start with Mr. Bernthal and go down the list.

Mr. BERNTHAL. Senator Evans, I have had reason to modify my views on that point after experiencing nearly three years now as a member of the Commission: I understand the Graham-Rudman issue before the Supreme Court may help us out ultimately in that respect.

Senator EVANS. We have not figured out a way to get 4.6 percent of the Commissioners eliminated. [General laughter.]

Mr. BERNTHAL. I continue to believe as a matter of principle that the Commission idea was a good one. I am using the past tense advisedly. What has happened to that good idea, however, has been a well meaning, well intended act called the Sunshine Act that effectively has destroyed the ability of this Commission to carry out what I believe was in the best public interest. And so I have reluctantly-based upon our experiences in the last year in attempting to modify the Commission's rules to comply with the Sunshine Act as it exists. I have reluctantly arrived at the conclusion that the better of the two choices at this point is a single administrator. I do that with great reluctance, because I think the concept was a good one. But it no longer is.

Senator EVANS. Mr. Palladino.

Mr. PALLADINO. I certainly strongly favor the single administrator. Let me say with Commissioner Bernthal's new position we may have a majority that might propose something.

Senator EVANS. Mr. Roberts.

Mr. ROBERTS. I will answer your question yes.

Senator EVANS. Admiral Zech.

Mr. ZECH. Yes; a single administrator is very definitely the more appropriate at this time in 1986.

Senator EVANS. Hooray.

The CHAIRMAN. We have not heard from Commissioner Asseltine. [General laughter.]

Senator EVANS. I understand that. I intend to submit that question to him and give him an opportunity to respond to it. Admiral Zech, could you try to relate the way in which you now handle the retrofit question in relation to our nuclear power plants and through the Nuclear Regulatory Commission to the way you handle the same sort of issues as they apply to our nuclear submarine fleet?

Mr. ZECH. Yes. First of all, we have recently passed the backfit rule, which does indeed and certainly should provide much more discipline, to our retrofit system, the backfit system that we have had in the past, and so I think that was a good rule that we passed, and I think it will lead to much more discipline, and actually lead, in my judgment, to safer and more reliable plants. However, that is a fairly recent rule, and I think the experience we have had prior to that rule was experience that could, in some cases, have led to decisions having made at lower levels in our organization than in my judgment they should have been made. These were all well meaning, but decisions made in isolation, if you will, that by themselves had good sense and good logic, but when you looked at the entire system and the entire plant, one could question those decisions.

So, we have changed that, and I would hope that now we have a much more disiciplined system, decisions being made at a higher level, and I think that should make significant improvement. Now, when you compare it to the Navy system, the Navy system is much more centralized control. Modifications were made only with very careful review at the top levels of the Navy. They were not made by officials at the lower levels in the organization. There was much more discipline to the Navy system. The Navy system, as you know, did have standardized plants, essentially standardized plants, and modifications were made only at the highest review in our Government.

Senator **Evans**. Were most of those made prospectively rather than required as backfits? Or how did you handle that?

Mr. **Zech**. I would say yes, most of them were made prospectively. On the other hand, there may have been some made—I cannot think of any offhand at the moment that were made as modifications, but I am sure there must have been some, but the plant was so well designed in the Navy as far as my experience goes that it was in a complete design, and if there are any modifications as the first of the class was being put together, they were made at the time on the spot, so that when the first design was completed, essentially the others following were no modifications at all.

I remember when I went to commission the *John Adams*, a Polaris nuclear submarine, I was instructed that I might have some grand ideas about changing the ship, but it is probably just as well if I minimize those ideas, because they thought they had a pretty good design, and if I had some suggestions to make, I would have a lot of convincing to do to change the design. All the other commanding officers had the same kind of guidance, but the point is, the design was completed and it was reviewed and analyzed extremely carefully, and there was essentially no need for any so-called backfits to be made in the Navy system, and I am convinced that the reason that that was possible is because the design itself was so complete to start with.

That is not the case in our plants now. As you know, we start off with 15 or 20 percent completion, and naturally there is going to be modifications as you go along, and so that is why the standardized design is so important in our commercial industry, so that we can at least approach the disciplined centralized standardization that we have in our very successful Navy programs.

Senator **Evans**. There has been a good deal of discussion this morning on the construction permit-operating license combination. In your view, would the proposed legislation or in your view would desirable legislation deny, for instance, a State agency in which the plant was located, or for that matter a citizen intervenor any opportunity or any inquiry to determine the adequacy of the plant to operate after the construction had been concluded?

In other words, if you are going to give them at the beginning of the process both an operating license and a construction permit, does that at that point deny any further review, looking at what actually has occurred versus the design that was anticipated in the beginning?

Mr. **Palladino**. Senator Evans, if someone had an issue of noncompliance with the construction quality assurance program, then that issue can be proposed as an item for litigation or for a hearing provided that the party can show that it was not corrected and also provided that the outcome would have an adverse effect on safety unless litigated, but it can be done, and the provisions are there for it to be done.

Senator EVANS. That would apply equally to an individual citizen intervenor, or to a state itself?

Mr. PALLADINO. Yes; it speaks generally. I forget what word they use. But it would include, I think, all of the intervenors.

Senator EVANS. What we are really talking about is overriding State licensing or procedural elements that might be in place right now if this law were to be passed.

Mr. PALLADINO. I am sorry.

Senator EVANS. Well, if this law were to be passed, would it have the effect of essentially overriding current State licensing and authorization procedures that might be different?

Chairman PALLADINO. Well, the States generally do not handle the review of nuclear powerplants. We do have agreements with States for handling radio isotopes and materials, radioactive materials.

Senator EVANS. Well, I think it is inaccurate to say that a good many States now have nuclear facilities citing councils or analytical procedures. I know we had the first one in the country, which was passed in 1970 in our State, and I know it was emulated by some other States.

Mr. PALLADINO. Well, nothing would prevent the State from having advisory councils.

Senator EVANS. Well, this is not advisory. This is a licensing procedure to ensure that all of the State laws that might be affected are handled when the plant is to be licensed, and it is done in parallel with the Federal.

Mr. PALLADINO. Well, those things that the State has authority for, certainly they would have to do. With regard to the licensing of the plant due to radiological considerations, that does refer to the Federal Government.

Senator EVANS. I realize that.

Mr. PALLADINO. But that does not exclude the State from coming in as a party and saying, we would like to be a party to this NRC case and raise questions or contentions. The State still can do that.

Mr. BERNTHAL. Senator Evans, I think that the key is that the States certainly retain all of their current rights with respect to site-specific issues. If a plant is proposed to be sited in that State, then those plant specific issues are litigable, as I understand it, under the proposed legislation just as they are now.

Senator EVANS. Well, you say they are litigable, but we have too much litigableness. I see you sitting here, and although I do not know it, I would judge that a distinguished group sitting in the first row behind you represents each of your legal counsels or something close to that. Can we not do it in a different way than litigation?

Mr. BERNTHAL. Well, we certainly could. The Atomic Energy Act when it was written, as I understand it, did not require, for example, that this Commission use an adjudicatory format in its hearing procedures. Nevertheless, it chose to do so. The tradition is now effectively established in law, and we no longer have the option of going, for example, to legislative hearings or legislative format type hearings, if that is what you are suggesting.

Senator EVANS. Maybe that is the second element in the revised Nuclear Regulatory Commission law that we ought to embark upon.

Mr. BERNTHAL. Well, I would listen with interest to any such proposal.

Mr. PALLADINO. Senator Evans, my legal assistant, who is sitting behind me, said that the proposed legislation changes would not affect the rights of the States in any proceedings.

Senator EVANS. But would it at all in terms of timing, where the combined license now does have presumably, and it is an effort to streamline and to shorten the affair, and if you give both the construction permit and the operating license at the beginning of the process, and for whatever reason the State feels that at some time they want to review the actual progress to make sure that the operating license fits, would they or would they not have that opportunity now? Presumably you are denying except under very restrictive occasions the opportunity for a citizen intervenor to get in there. Would the States have the same position as a citizen intervenor?

Mr. PALLADINO. I think you are asking two different questions, one having to do with hearings and one not having to do with hearings. With regard to hearings, the hearings on the CP-OL would be based upon information that is available at that time, which would include a complete design of the plant. The hearing at the end of the process or near the end of the process would come about if there is a dispute of fact that could not be resolved without a hearing, and if these issues were not and could not have been handled at the CP-OL time, or if there has been an allegation of nonconformance that has not been corrected and which could adversely affect the safety of the plant. Those issues still can be the subjects of hearings.

Now, then, you asked the question along the way, can inspectors from the State come in and participate? Usually those things are handled on a cooperative basis. There are some inspectors, for example, that would be ASME inspectors that participate in the process, but I do not think this legislation would change any of that. If my technical colleagues believe I am wrong, would they please speak up?

Senator EVANS. Well, I have got one other question, the same one that I asked the Secretary. I had tried to describe briefly the options process we have adopted in electric power planning in the Northwest in an attempt to try and shorten the uncertainty of lead time by the potential of purchasing an option or establishing an option which would be that length of time required to go through all of the environmental and other procedures to develop the design to get right up to the time of construction, and then not necessarily proceed immediately with construction, but to hold it until you are more certain of the need for electricity, recognizing that now you have shortened the lead time of construction down to 4 years, 3 years, whatever the construction period would be required.

That may require continuing the approval as it is mothballed, if you will, for a certain number of years. Is that a procedure you think is wise, doable? Should it be part or more explicitly part of the new law that we are considering? That opportunity, in other words, to have a standardized design and a cite-specific plan all approved gives someone the opportunity to move ahead with construction and have an operating license combined with that, and then put it in mothballs for maybe 2, maybe 3, maybe 5, 6 years, until such time as they were ready to proceed with construction.

Mr. PALLADINO. Assuming I understand the question correctly, we do have in the proposed legislation, I think, both bills, a proposal that a design be approved for a 10-year period——

Senator EVANS. That is a generic design, however.

Mr. PALLADINO. Yes, it would be the design that is available.

Senator EVANS. I am talking about a cite-specific design which now has achieved a construction permit combined with an operating license.

Mr. PALLADINO. Let me go to the second part, and I think I will respond to your question. There is a generic design review and there is a site review, and then a utility at this stage can say, all right, now, I want to marry these two, and NRC would do a review to see whether anything needs to be changed as a result of the marriage. Then, having gotten the CP-OL, I do not believe the utility is obligated to go ahead, so if they wanted to mothball, they could, but I can ask my legal counsel.

Senator EVANS. Well, how long, in your interpretation, how long under this legislation could you mothball or delay a cite-specific plant which was ready for construction and which had the construction permit-operating license in hand?

Mr. PALLADINO. Well, I am always in danger when I speculate, but I am going to speculate, and that way maybe I will find out whether I understand the situation as well. I think if there is an approved generic design, a license for the particular site, and the utility has a combined CP-OL, that as long as the other two are valid, the combined ought to be valid. Now, let me check with my legal counsel and see if I understood it correctly.

[Pause.]

Mr. PALLADINO. I think in general my answer is right, although there may be some minor complicating features such as the need for power findings under NEPA, but I believe what I said basically is correct.

Senator EVANS. Well, maybe for the record it would be helpful and we may want to submit some more specific questions or to at least get a particular answer that would tell us whether you think any further addition to the legislation is needed to make quite explicit the opportunity for utilizing that options process, and in essence storehousing approved, preapproved site-specific plants for some specific period of time, perhaps subject after some period of time to some kinds of review. I do not know precisely how long you would feel comfortable in keeping those on the shelf, but we think that it has potentially very good opportunity to allow utilities, and particularly where we have a Bonneville system, allow the system itself to protect against future power shortages to drastically reduce the period of uncertainty and to get us much closer to a least cost power future.

Mr. BERNTHAL. Senator, if I could just comment, I think the idea is an excellent one. One of the things that this country needs to do during this hiatus in powerplant orders and construction is to preserve acceptable sites, and I believe that the early siting consideration provisions in this proposed legislation address the concerns that you have, and I trust would conform with the desires of the people in the State of Washington, but it is very clear that that is a desirable path to follow to bank, as it were, certain sites that have had completed studies ahead of time.

Senator EVANS. I might say that in 1970, when we first proposed and passed siting legislation, one of the elements that we suggested was just exactly that, preapproved sites, which could be banked, and the utilities all told us to get lost, that we were getting into their business, and we did not need to do that. I think maybe they have a different idea at the moment.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much, Senator Evans. I want to follow through on that latter part of the questioning in a little further detail. And we will submit questions along that line as well, but as an example today you do, because of the NEPA evaluation, get into questions such as the need for power as one of the evaluations. Is that not correct?

Mr. PALLADINO. That is correct.

The CHAIRMAN. It has been my feeling, and I know it is not necessarily shared by anyone else, but I feel very strongly about it, that the Federal Government ought not to be making that evaluation, that the need for power is a State regulatory process determination, but that question aside, under the current situation, the need for power is considered up front, but when you get the plant all completed and you are ready to turn it on, that issue can again be raised. Is that not correct?

Mr. MELSCH. Senator, not at the operating license stage.

The CHAIRMAN. At the operating license stage you cannot raise that?

Mr. MALSCH. The need for power is resolved at the construction permit stage.

The CHAIRMAN. And it cannot be raised again?

Mr. MALSCH. Not absent some unusual circumstances, but in general it cannot be raised.

The CHAIRMAN. What kind of unusual circumstance could we hypothesize?

Mr. MALSCH. I couldn't think of one.

The CHAIRMAN. That was a cautious statement, both of them. [General laughter.] But it was suggested by you, Mr. Chairman, that if indeed we follow the scenario that Senator Evans had raised, that to go through a generic design where somebody has put up all the money and that is not just a few thousand dollars to have a completed design and go through all of the process, you are talking about millions of dollars to get up to the point where you now have a site-specific approval, and you are suggesting that if there were any substantial delay from getting to that point in the actual beginning of the construction permit, you might have to go back through a NEPA process. You said the need for power was a part of the NEPA process. That implies that the NEPA process could be started over again if there was substantial delay from getting to the point of starting construction and a discrete decision to delay the start of construction, and then if they wanted to start construction, you might have to start all over again.

Mr. PALLADINO. Well, Senator McClure, I think I answered a somewhat different question, or in a different way. I said that I believed that as long as the early site review permit was in effect, and as long as the generic design review was in effect, and the utility had combined a CP-OL, that CP-OL was good as long as the other two were in effect, and then my legal assistant said perhaps there is some complication having to do with the NEPA requirements on need for power. And I indicated that I was not prepared to discuss that.

The CHAIRMAN. I assume that if need for power which is brought in under the NEPA process, if that is an adequate reason to raise that issue again after a delay, any other thing that could be brought in under the NEPA process could also be raised, which in effect is starting the NEPA review all over again.

Mr. PALLADINO. Well, I suppose there are circumstances that could happen over a 5- to 10-year period if that were the length of delay. That could influence the need for power.

The CHAIRMAN. Well, maybe we do need to legislate in this area to define what might or might not be subject to reinstitution of new proceedings.

Mr. BERNTHAL. Senator, I think it is safe to say that no one sitting at this table has ever had the pleasure of having to deal with the NEPA process in the context of a construction application, but my understanding is that you are right. In principle, parties, after some period of time, may seek to reopen the questions under NEPA. I could not agree with you more that it should not be the province of the Federal Government, and certainly not the NRC and these Commissioners to make judgments on need for power, and I would say that this Commission, to the extent we are permitted under law, has adopted a very minimalist interpretation, shall I say, of that mandate under NEPA. I do not feel that that is an appropriate province for Commission consideration.

The CHAIRMAN. It would seem to me that a State finding at the beginning of a need for power under their regulatory process ought to satisfy all of the Federal requirements in that regard, and that there should not be two separate proceedings, one under the State law and one under Federal law, and then the prospect of at some point midstream having to start it all over again chills me. I suppose we could draft an appropriate legislative standard for not relitigating things that had already been determined unless there was a substantial change of condition that required it. I do not know whether your rules now contemplate that or cover that contingency, or whether or nor further legislation would be useful in that regard.

Certainly if you have a single construction and operating license, which I strongly support, the greater the length of time between beginning and end, the more demand there will be for an opportunity to review at least in some degree the decisions that were made up front to see whether they are still valid. And I assume, too, that Senator Evans was getting at something else I am not really certain that we got a very clear answer to. Assume that we pass legislation that does provide for a better procedure, a better process, a more predictable process on the Federal side, and the State has their own process that is distinct and different from the Federal process. Should we preempt the State from raising issues in a different manner or on a different time frame than the process followed by the Federal and under the Federal statute if we carefully preserve to the State those things which are the State's prerogatives, and then carve out an area which is exclusively Federal responsibility and preempts State law, is that something we should do?

Mr. PALLADINO. At the present time, the States interact at various times during the process, but we are not doing anything to change the State's authority.

The CHAIRMAN. I am not asking you to do anything to change. I am asking whether or not we ought to make certain that the State does not have its own regulatory process that overlaps and requires a separate decisionmaking schedule or standards or reviews for precisely the things that are within the area of responsibility of the Nuclear Regulatory Commission.

Mr. PALLADINO. I hate to answer that in the abstract. May we respond to that for the record, because I would like to make sure that I understand what the relative permits are that the State might introduce and that could interact with us.

The CHAIRMAN. We would appreciate that response.

Mr. Bernthal.

Mr. BERNTHAL. Mr. Chairman, it is clear that that issue of NEPA and especially this question of whether the Commission should be reviewing need for power deserves a very careful look. I think we have not focused on that in the context of the proposed legislation. To make my view very clear—I think I already have—we have no business doing that aspect of things. That should be a State prerogative. To the extent the States select the sites and make what determinations they need to there, that clearly should be a State prerogative, and on the other hand the technical evaluations of the adequacy of the plant design and the final decisionmaking authority on that technical evaluation it seems clear to me has to rest with the Federal Government and with the Commission. That would be the way that I would delineate the separate responsibilities.

The CHAIRMAN. That sounds appropriate to me, because I do not think if we are really trying to give predictability to this system, that we want to permit the opportunities for States themselves to substitute their discretion on the technical aspects of the sufficiency of the design or the site once they have approved the site in terms of their responsibility, and that I would perceive to be a siting decision based upon the availability of power at an appropriate point within the service area or transmission possibilities.

They may also under State law wish to look at some other questions with respect to proximity to populations. Transportation corridors, and things of that nature may indeed be an appropriate State decision, but if they once make that decision up front, it does not seem to me that anybody ought to be able to come back in at the end of the process, and here is a plant all licensed and ready to turn on, and then the State says, oh, we want to take a look at site selection again, or we want to look at the need for power again, or we want to review any number of things that really have already been reviewed once and decisions made.

Now, I say that not because I do not want to allow some flexibility in the process, but by that time there are hundreds of millions if not billions of dollars already committed, spent. If there is that kind of uncertainty in the process, who is going to spend the billions of dollars? Now, you have by uncertainty alone foreclosed the option.

Mr. BERNTHAL. I think your argument is further supported by the point of fact that very few of these facilities any more serve a single State. Most of them, especially in times of stress, peak loads, summer or winter, serve several states via the national grid, and so I think the point is very well taken, Senator.

The CHAIRMAN. Thank you very much. We have some other questions to submit for the record, and we will appreciate your response.

Thank you very much, gentlemen. We appreciate your testimony this morning. We will immediately move to the other panel. Under the rules of the Senate, we can proceed until 3 o'clock. We will attempt to move as expeditiously as possible, and based on the availability of people to chair, we are going to plow right ahead if that is not impossible for members of the panels yet to be heard from.

We will next hear from a panel of public witnesses, Mr. Keith Turley, chairman and chief executive officer of the Arizona Public Service Co.; Mr. Rick Priory, vice president, design and engineering, Duke Power Co.; Mr. Howard Friend, vice president, Bechtel Power Corp.

I understand that Stone & Webster Corp. has indicated a desire to submit written testimony, but they were unable to appear this morning. That written testimony will be made a part of the record.

[The statement of Stone & Webster Engineering Corp. follows:]

STATEMENT FOR THE RECORD
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASSACHUSETTS

COMMITTEE ON ENERGY & NATURAL RESOURCES
U.S. SENATE
APRIL 22, 1986

Stone & Webster Engineering Corporation (SWEC) has a long history of support for and participation in standardization activities. We initiated our reference design efforts in the 1960s, submitted our reference nuclear plant design for a balance of plant matched with various pressurized water NSSS' in 1974, and received 3 preliminary design approvals (PDAs) for this design. This design is an entire non-site specific balance of plant design backed up by a large number of drawings and standard specifications along with a large-scale design and constructibility model.

Our standardization emphasis is reflected throughout our activities. We utilize a standard nuclear quality assurance program approved through the NRC topical report system and have other standard methods and designs approved as topical reports. Many of our in-house construction and engineering methods are standardized. This philosophy results from our belief - based on extensive experience - that standardization results in better designs, a shorter project schedule, and confidence in this schedule.

We are firmly convinced standardization and related measures will assure adequate safety while creating an environment of predictability and reasonable certainty as to the licensing process. Such improvement is essential to a climate in which utilities will once again consider ordering nuclear power plants. Because about half the cost of a plant is a function of the time involved -- as reflected in interest and inflation -- it is imperative to bring greater stability to the overall process.

The current statutory licensing procedures were developed when the nuclear industry was getting started. This process has proven to be cumbersome, lacking in stability, and unnecessarily costly to the consumer, the regulators, and the industry. In addition, it diverts scarce regulatory and industry resources from uses that would better serve the consumer. Thus, standardization is greatly needed to combat inefficiencies in the current regulatory regime.

Standardization consists of reference designs, approved by NRC, independent of site or license application. Under such an approach, the developer of a design for nuclear plant or major portion of a plant would submit a Safety Analysis Report with an application for a Design Approval. The applicant could be either a reactor manufacturer, an engineer-constructor, a utility, or any combination of these. The application could describe a nuclear steam supply system, a balance of plant, or some other discreet system as permitted under the existing NRC standardization policy. An entire plant could also be described as was done under the manufacturing license, duplication, and replication options of this NRC standardization policy.

We endorse the use of a balance of plant matched with a nuclear steam supply system, because it is consistent with the well-tested and long-standing practices in the nuclear industry. Also, the use of this approach will ensure that the significant amount of expertise now within existing engineer-constructors and reactor manufacturers would not be lost and there would be no loss of continuity due to the loss of this expertise in maintaining safe operation of plant designs already in use.

The many benefits of standardization can best be realized through use by all of the qualified participants in the nuclear business. Legislation, therefore, should direct rather than merely authorize the NRC to establish procedures for approval of both facility and major subsystem designs. This will ensure establishment of procedures to provide maximum flexibility and uses of pre-approved designs.

An appropriate base for standardization to build upon is available in today's plants. The level of safety of these plants is high. The extreme level of conservatism present is evidenced in the available documentation that shows the amount of radioactivity assumed to be released from the plant in a postulated accident - the nuclear source term - used in the design of these plants is considerably overstated.

An important aspect of both the standard design and the single-stage licensing process is determining the extent and level of design information necessary for the NRC to determine that a plant or major subsystem is designed, and can be constructed and operated, in conformity with the provisions of the Atomic Energy Act and the NRC's rules and regulations. We believe an in-between level of design information; i.e., a considerably greater level of detail in many areas than a current Preliminary Safety

Analysis Report but less than a current Final Safety Analysis Report, would be sufficient and reasonable for the NRC to reach a conclusive safety determination. The design documents such as calculations for cable tray loads and drawings for items such as pipe supports are used primarily in the construction phase rather than the initial phase and need not be submitted as part of the approval process. They also must be checked after procurement of hardware. The appropriate design level requires criteria and standard specification and design methods which are verifiable by the NRC, as necessary, during procurement and implementation of the design.

Nuclear plant standardization must carry with it the discipline of regulatory stability. This discipline must be exercised by everyone concerned with the engineering, design, licensing, and construction of a nuclear power plant. "Everyone," in this case, includes the utility, the engineer-constructor, the reactor manufacturer, and federal and state regulatory authorities. After millions of dollars have been spent developing a standardized reference plant, few benefits are gained when that design is revised. Regulatory stability is needed to impose order on the process of changing a nuclear plant design. Undisciplined change prevails under the current multi-stage licensing process; undisciplined change comes from changes in regulatory requirements, from a "better mousetrap" approach to engineering design, and from a change in basic design. However, a marginal or unnecessary change never remains minor. Efforts previously performed must be undone and redone, and the cost and schedule benefits of standardization are quickly lost. Too often changes imposed on a plant are not justifiable in terms of public safety or of cost effectiveness. Unnecessary change has occurred frequently in the past when regulatory requirements were changed after issuance of a permit or license and the licensee was required to adhere to new rules. It is the combination of standardized reference designs and change control that will establish the much needed stability in the licensing process.

It has been proposed, and it appears arguable as a legal matter, that many of the concepts of standardization could be achieved through administrative action.

We submit that because the concepts would be departures from long-standing policy and practice, they would likely encounter considerable resistance and, perhaps, challenge in the courts. Other aspects clearly require changing the law, such as the single-stage hearing for a Construction and Operating License. Given this situation, we are convinced that making all of the changes by law will ensure maximum certainty in the minimum amount of time.

Legislation is necessary to provide the discipline discussed above and to provide for the long-term policies which would transcend individual philosophies within NRC and the nuclear industry. Administrative reforms alone, involving the exercise of discretion by NRC, have proved to be insufficient. In our view, it is important that Congress clarify its position and take a leadership role to provide the legislation required to stabilize nuclear regulation and licensing. In simplistic terms, Congress must express its intent and provide the legislative impetus to make it happen. Careful use by the NRC of the recently enacted backfit rule for standard designs also will provide stability for such designs.

It is in the public interest to weigh any enhancement in the overall level of health and safety to the public against the cost to the public. This balancing will greatly stabilize design and site approvals and enhance standardization. It will also stabilize the entire industry, from plants under construction to plants in operation. Proper backfit requirements are basic to the continued viability of the nuclear industry and should be applied throughout all phases of design, construction, operation, and regulation.

We believe that the standardization process would be substantially enhanced by the enactment of the legislative proposal before you now. For instance, the "conclusiveness" of design approval would prevent repetitive litigation. Additionally, the criteria to be applied in approving changes to such design approvals are consistent with the principles of standardization. Similar provisions are accorded the approval of a site.

A standardized design approval or certification should be effective for an initial period of ten years with a presumption in favor of allowing the approval or certification to remain in effect following its initial 10-year term, unless significant new information would preclude such an extension. This time period is consistent with the time frames associated with significant analytical or design innovations and incorporation of operating plant experience.

The industry, especially the utility sector, needs a clear and strong statement that the current licensing morass will, in fact, be eliminated. While many of these proposed improvements appear to be administrative in nature, confidence in a revised, stable licensing process can best be assured if such improvements are supported by an underpinning founded in law.

We appreciate the opportunity to present these views and express the hope that your Committee and the Congress will act soon to enact these improvements so important to ensuring the availability of nuclear power as a critical element in the nation's supply of electricity. The need for this legislation is now and the Congress should not delay action on it until the extension of Price Anderson Legislation is enacted.

The CHAIRMAN. Mr. Turley.

STATEMENT OF KEITH L. TURLEY, CHAIRMAN OF THE BOARD AND CHIEF EXECUTIVE OFFICER, ARIZONA PUBLIC SERVICE CO.

Mr. TURLEY. Thank you, Mr. Chairman.

The CHAIRMAN. I might just mention at the outset that any prepared statements you have will be made a part of the record, and you are invited to summarize or hit the high points in whatever way you desire.

Mr. TURLEY. I will attempt to do so. Thank you very much.

As a little background, Mr. Chairman, about 15 years ago APS and other southwestern electric utilities embarked upon planning the Arizona Nuclear Power Project, which has culminated in the Palo Verde nuclear generating station. My company owns 29.1 percent of Palo Verde, and we serve as the project manager and operating agent for a consortium of six other utilities.

We are bringing on line three 1,270-megawatt units. Palo Verde Unit 1 entered operation in January of this year, while Palo Verde Unit 2 is undergoing low power operational testing. And we are scheduled to appear tomorrow before the NRC seeking a full power license for Unit 2. Palo Verde Unit 3 is 98 percent complete, with fuel loading anticipated around the first of the year.

While I am pleased with our progress, our success in large part is attributable to the prudent choices we made at the outset of the project. We selected a combustion engineering system, 80 nuclear steam supply system. The CE system was of standard design, submitted and ultimately approved by the Nuclear Regulatory Commission. This design was referenced in the Palo Verde application for a construction permit for Unit 1, and then this design was replicated for Units 2 and 3.

The benefits associated with the selection of a standard design enhanced our construction efficiency and will enable us to better utilize manpower, spare parts, maintenance experience, and other items common to all three facilities. Keeping in mind our experience with the three Palo Verde nuclear units, my company is already looking to the time when we will again require additional baseload capacity, but in the general scheme of things the likelihood of nuclear power being part of our generation-planning alternatives is suspect.

There are several reasons for this, and during this Committee's hearing last July on electricity adequacy I testified about some of the more immediate ones, the tremendous amount of risk assumed by the utility in constructing new generation without support from regulators and the punitive attitude on the part of ratemaking bodies with regard to investment recovery that has brought a wave of prudency audits into vogue.

Investment recovery is a critical factor in considering additional future generation whether building fossil or nuclear plants, and there is no doubt in my mind, however, that the most significant factors impacting the investment in such facilities are the imponderables that can arise during the intervening period from concept to kilowatts. The more protracted this period becomes, the higher the financial risk. Double-digit inflation, interest rates hovering around 20 percent, and other factors definitely impacted the Palo Verde costs, despite the fact that Palo Verde's construction period is less than the national industry average for contemporary units.

When design and construction periods for large nuclear power stations stretched from roughly 6 years to today's norm of 10 to 15 years, they began to extend beyond both the career and planning horizons of utility regulators and utility managers alike. A 10- to 15-year construction period, as I said, during this committee's hearing last July "is longer than the memories of authorities that regulate our industry, leaving hindsight as the measure of the quality of utility management's decisions."

Now, if we want to preserve the nuclear option, and I think it is in the national interest that we do so, then we must achieve four integrated goals: one, a reduction in the licensing construction time period to no more than 6 years; two, the ability to establish predictable cost of a project; three, stability in NRC regulatory requirements; and four, preconstruction commitment by rate regulators to allow full-cost recovery.

S. 2073 addresses three of these four requirements. Standardization of design and stability of regulatory requirements, to which S. 2073 is directed, should permit us to achieve a 6-year schedule at predictable costs. If we can achieve these goals, it may be possible to obtain the vital preconstruction cost recovery commitment from our local rate regulators, and if we cannot, the survival of the nuclear option is, indeed, very bleak.

If a new regulatory system can be created, one that would allow me to tell my board of directors and shareholders that a new nuclear plant could be brought on line in 6 years at a predictable cost, then we might again consider the nuclear option and seek the prerequisite cost recovery commitment from our rate regulators.

Mr. Chairman, S. 2073 provides the framework for the new regulatory system I am talking about. Implicit in S. 2073 is the recognition that today's two-step licensing process based on separate construction permits and operating licenses is counterproductive. It encourages engineers and the NRC to delay safety-related decisions until a unit's construction is well under way, and the results, of course, are a stream of design changes and rework and loss of control and schedules and costs.

In short, Mr. Chairman, the two-step licensing system that Congress created 31 years ago fit an infant industry in which reactor designs were constantly evolving as new knowledge was acquired. I believe the time has come now for re-evaluating our licensing process in order to achieve a better balance of public input, safety review, and technological considerations in an attempt to lower costs and reduce risks and maintain safety.

While APS has demonstrated that a single company can achieve a measure of standardization by duplicating a single unit, the utility industry as a whole needs to be able to order preapproved standardized plants whose designs are essentially complete with changes having to be made only according to the requirements of specific sites, for example, a dry site versus freshwater or saltwater cooling. It would seem logical, Mr. Chairman, that had S. 2073 been in effect today, the nuclear steam supply system and balance of plant associated with Palo Verde would be the functional model for standardization.

Having survived extensive hearings on the plant's design, construction, and operation, we would have a nuclear plant system capable of being boxed and packaged for purchase by utilities across the Nation with minimal changes or adaptations to local conditions. But for this scenario to come to pass, the nuclear energy industry is in need of legislation such as S. 2073. S. 2073 affords the public ample opportunity for review and comment and participation in hearings under very reasonable circumstances.

This bill allows for reducing lead times through the preapproval process, thereby limiting the burden of relitigating the same plant design issues over and over again at each new site. The genius of S. 2073, Mr. Chairman, is that the legislation drives standardization by allowing the NRC to issue combined construction permits and operating licenses in what is called a COL.

It also encourages standardization by directing the Commission to establish procedures for licensing standard designs independent of whether a utility order exists at the time or not. Licensing a design under S. 2073 would require a public hearing. The legislation directs the NRC to establish procedures to preapprove after public hearings on nuclear power plant sites.

As a utility executive with experience in nuclear energy, I approve of the fact that S. 2073 does not remove strict regulatory oversight. The bill front loads a good bit of it, however, and shifts more of the regulatory burden to nuclear power plant equipment vendors and architect engineers who must face the NRC oversight in the hearings process before a utility ever enters the picture.

We, the utility, would face the NRC and a public hearing when we apply for a COL to build a prelicensed plant. By then many, if not most, safety issues will have been resolved. I remarked earlier that a COL drives standardization. I would like to take just a moment to explain what I meant. In order to issue a COL, the NRC would have to have complete design information necessary to determine that a plant could be built and operated safely. Providing a complete design for a COL application will increase front end costs. The control of these initial costs will drive standardization of designs.

Let me address one other need utility executives have before a company like APS considers ordering another nuclear unit. We need to have greater public confidence in nuclear power by making public participation in plant licensing and construction decisions more meaningful. I believe that this process is much improved under the provisions of S. 2073.

In the case of the present two-stage licensing process the NRC's special inquiry group which investigated the TMI accident concluded that the first public hearing is held "too early to be useful, and the other is too late to be fully effective."

Accordingly, both the Rogovin group and the Kemeny Commission urge Congress to abolish the two-step process. By contrast, S. 2073's COL provision tells the public and the utility up front exactly what is going to be required to assure safe construction and operating procedures. Critical in S. 2073 is that a COL issued to a utility would specify all inspections, test analyses, and acceptance criteria that would have to be used to assure quality construction.

Since COL is a license, that could only be issued after a public hearing. The public would know before any concrete was poured exactly how the proposed nuclear power plant would be tested for safety, and how the validity of those tests would be judged or accepted.

I would like to conclude my prepared remarks by recognizing that some people who profess to favor nuclear power plant standardization do not believe that legislation like S. 2073 is necessary. I have heard it argued that the NRC could simply issue an administrative rule requiring essentially complete standardized designs before a construction permit is issued in today's two-step process. While this position may be theoretically true, it is also meaningless. Vendors, and especially architect engineers, would be asked to invest huge sums of money up front while knowing that the NRC could continue to order expensive changes at any time.

Utilities would be asked to construct standard plants that will not stay standardized very long unless there is legislative authority for regulatory stability during construction. In short, an NRC rule without legislation would be a nonstarter, because it would not give companies like mine the confidence we need to once again make long-term investments in nuclear energy. We have more faith in the stability of laws than we have in agency rules by themselves.

Mr. Chairman, S. 2073 will not solve every problem or please every company or every intervenor, but if this Congress and if this country wants in any way to maintain a nuclear option for the 1990's and beyond, then the time to begin is now, and the place to start is with S. 2073.

Thank you very much.

[The prepared statement of Mr. Turley follows:]

* * * * *

STATEMENT OF

KEITH L. TURLEY
CHAIRMAN OF THE BOARD, AND
CHIEF EXECUTIVE OFFICER

ARIZONA PUBLIC SERVICE COMPANY

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

* * * * *

APRIL 22, 1988

Mr. CHAIRMAN AND MEMBERS OF THE COMMITTEE, IT IS CERTAINLY MY PLEASURE TO APPEAR BEFORE YOU ONCE AGAIN. MY NAME IS KEITH L. TURLEY. I AM CHAIRMAN OF THE BOARD AND CHIEF EXECUTIVE OFFICER OF ARIZONA PUBLIC SERVICE COMPANY (APS). APS IS AN INVESTOR-OWNED ELECTRIC UTILITY SERVING 1.4 MILLION ARIZONANS OR ABOUT 45% OF THE STATE'S POPULATION IN 11 OF ARIZONA'S 15 COUNTIES.

ALMOST 15 YEARS AGO, APS AND OTHER SOUTHWESTERN ELECTRIC UTILITIES EMBARKED UPON PLANNING THE ARIZONA NUCLEAR POWER PROJECT WHICH HAS CULMINATED IN THE PALO VERDE NUCLEAR GENERATING STATION (PVNGS). APS OWNS 29.1% OF PVNGS AND SERVES AS THE PROJECT MANAGER AND OPERATING AGENT FOR A CONSORTIUM OF SIX OTHER UTILITIES IN BRINGING THREE 1270 MEGAWATT UNITS INTO SERVICE. PALO VERDE UNIT 1 ENTERED FIRM OPERATION IN JANUARY OF THIS YEAR, WHILE PALO VERDE UNIT 2 IS UNDERGOING LOW POWER OPERATIONAL TESTING AND WE ARE SCHEDULED TO APPEAR BEFORE THE NRC TOMORROW SEEKING A FULL POWER LICENSE. PALO VERDE UNIT 3 IS 98% COMPLETE WTH FUEL LOADING ANTICIPATED AROUND THE FIRST OF THE YEAR.

WHILE I AM PLEASED WITH OUR PROGRESS, OUR SUCCESS IN LARGE PART IS ATTRIBUTABLE TO THE PRUDENT CHOICES WE MADE AT THE OUTSET OF THE PROJECT. ANPP SELECTED A COMBUSTION ENGINEERING (CE) SYSTEMS 80 NUCLEAR STEAM SUPPLY SYSTEM. THE CE SYSTEM WAS OF STANDARD DESIGN SUBMITTED AND ULTIMATELY APPROVED BY THE NUCLEAR REGULATORY COMMISSION. THIS DESIGN WAS REFERENCED IN THE PALO VERDE APPLICATION FOR A CONSTRUCTION PERMIT FOR UNIT 1. THEN THIS DESIGN WAS REPLICATED FOR UNITS 2 AND 3.

THE BENEFITS ASSOCIATED WITH THIS SELECTION OF A STANDARD DESIGN ENHANCED OUR CONSTRUCTION EFFICIENCY AND WILL ENABLE US TO BETTER UTILIZE MANPOWER, SPARE PARTS, MAINTENANCE EXPERIENCE AND OTHER ITEMS COMMON TO ALL THREE FACILITIES.

KEEPING IN MIND OUR EXPERIENCE WITH THE THREE PALO VERDE NUCLEAR UNITS, APS IS ALREADY LOOKING TO THE TIME WHEN WE WILL AGAIN REQUIRE ADDITIONAL BASE LOAD CAPACITY, BUT IN THE GENERAL SCHEME OF THINGS, THE LIKELIHOOD OF NUCLEAR POWER BEING PART OF OUR GENERATION PLANNING ALTERNATIVES IS SUSPECT. THRERE ARE SEVERAL REASONS FOR THIS, AND, DURING THIS COMMITTEE'S HEARING LAST JULY ON ELECTRICITY ADEQUACY, I TESTIFIED ABOUT SOME OF THE MORE IMMEDIATE ONES: THE TREMENDOUS AMOUNT OF RISK ASSUMED BY THE UTILITY IN CONSTRUCTING NEW GENERATION WITHOUT SUPPORT FROM REGULATORS AND A PUNITIVE ATTITUDE ON THE PART OF RATE MAKING BODIES WITH REGARD TO INVESTMENT RECOVERY THAT HAS BROUGHT A WAVE OF PRUDENCY AUDITS INTO VOGUE.

INVESTMENT RECOVERY IS A CRITICAL FACTOR IN CONSIDERING ADDITIONAL FUTURE GENERATION WHETHER BUILDING FOSSIL OR NUCLEAR UNITS. THERE IS NO DOUBT IN MY MIND, HOWEVER, THAT THE MOST SIGNIFICANT FACTORS IMPACTING THE INVESTMENT IN SUCH FACILITIES ARE THE IMPONDERABLES THAT CAN ARISE DURING THE INTERVENING PERIOD FROM CONCEPT TO KILOWATTS. THE MORE PROTRACTED THIS PERIOD BECOMES, THE HIGHER THE FINANCIAL RISK. DOUBLE-DIGIT INFLATION, INTEREST RATES HOVERING AROUND 20% AND OTHER FACTORS DEFINITELY IMPACTED PALO VERDE COSTS DEPITE THE FACT THAT PALO VERDE'S CONSTRUCTION PERIOD IS LESS THAN THE NATIONAL INDUSTRY AVERAGE FOR CONTEMPORARY UNITS.

WHEN DESIGN AND CONSTRUCTION PERIODS FOR LARGE NUCLEAR POWER STATIONS STRETCHED FROM ROUGHLY 6 YEARS TO TODAY'S NORM OF 10-15 YEARS, THEY BEGAN TO EXTEND BEYOND BOTH THE CAREER AND PLANNING HORIZONS OF UTILITY REGULATORS AND UTILITY MANAGERS ALIKE. A 10-15 YEAR CONSTRUCTION PERIOD, AS I SAID DURING THIS COMMITTEE'S HEARING LAST JULY, IS "LONGER THAN THE MEMORIES OF ... AUTHORITIES THAT REGULATE OUR INDUSTRY, LEAVING HINDSIGNT AS THE MEASURE OF THE QUALITY OF UTILITY MANAGEMENT'S DECISIONS".

IF WE WANT TO PRESERVE THE NUCLEAR OPTION (AND I THINK IT IS IN THE NATIONAL INTEREST THAT WE DO SO) THEN WE MUST ACHIEVE FOUR INTEGRATED GOALS:

1. A REDUCTION IN THE LICENSING/CONSTRUCTION TIME PERIOD TO NO MORE THAN SIX YEARS;
2. THE ABILITY TO ESTABLISH PREDICTABLE COSTS OF A PROJECT;
3. STABILITY IN NRC REGULATORY REQUIREMENTS; AND
4. PRECONSTRUCTION COMMITMENT BY RATE REGULATORS TO ALLOW FULL COST RECOVERY.

S. 2073 ADDRESSES THREE OF THESE FOUR REQUIREMENTS. STANDARDIZATION OF DESIGN AND STABILITY OF REGULATORY REQUIREMENTS, TO WHICH S. 2073 IS DIRECTED, SHOULD PERMIT US TO ACHIEVE A SIX YEAR SCHEDULE AT PREDICTABLE COSTS. IF WE CAN ACHIEVE THESE GOALS, IT MAY BE POSSIBLE TO OBTAIN THE VITAL PRECONSTRUCTION COST RECOVERY COMMITMENT FROM OUR RATE REGULATORS. IF WE CANNOT, THE SURVIVAL OF THE NUCLEAR OPTION IS INDEED VERY BLEAK.

IF A NEW REGULATORY SYSTEM CAN BE CREATED, ONE THAT WOULD ALLOW ME TO TELL MY BOARD OF DIRECTORS AND SHAREHOLDERS THAT A NEW NUCLEAR PLANT COULD BE BROUGHT ON LINE IN SIX YEARS AT A PREDICTABLE COST, THEN APS MIGHT AGAIN CONSIDER THE NUCLEAR OPTION AND SEEK THE PREREQUISITE COST RECOVERY COMMITMENT FROM OUR RATE REGULATORS. MR. CHAIRMAN, S 2073 PROVIDES THE FRAMEWORK FOR THE NEW REGULATORY SYSTEM I'M TALKING ABOUT.

IMPLICIT IN S. 2073 IS THE RECOGNITION THAT TODAY's TWO-STEP LICENSING PROCESS, BASED ON SEPARATE CONSTRUCTION PERMITS AND OPERATING LICENSES, IS COUNTER PRODUCTIVE. IT ENCOURAGES ENGINEERS AND THE NRC TO DELAY SAFETY RELATED DECISIONS UNTIL A UNIT'S CONSTRUCTION IS WELL UNDERWAY. THE RESULTS ARE: ONE, A STREAM OF DESIGN CHANGES AND REWORK; AND TWO, LOSS OF CONTROL OF SCHEDULES AND COSTS.

IN SHORT, MR. CHAIRMAN, THE TWO-STEP LICENSING SYSTEM THAT CONGRESS CREATED 31 YEARS AGO FIT AN INFANT INDUSTRY IN WHICH REACTOR DESIGNS WERE CONSTANTLY EVOLVING AS NEW KNOWLEDGE WAS ACQUIRED. I BELIEVE THE TIME HAS COME FOR RE-EVALUATING OUR LICENSING PROCESS IN ORDER TO ACHIEVE A BETTER BALANCE OF PUBLIC INPUT, SAFETY REVIEW AND TECHNOLOGICAL CONSIDERATIONS IN AN ATTEMPT TO LOWER COSTS, REDUCE RISKS AND MAINTAIN SAFETY.

WHILE APS HAS DEMONSTRATED THAT A SINGLE COMPANY CAN ACHIEVE A MEASURE OF STANDARDIZATION BY DUPLICATING A SINGLE UNIT, THE UTILITY INDUSTRY AS A WHOLE NEEDS TO BE ABLE TO ORDER PRE-APPROVED STANDARDIZED PLANTS WHOSE DESIGNS ARE ESSENTIALLY COMPLETE, WITH CHANGES HAVING TO BE MADE ONLY ACCORDING TO THE REQUIREMENTS OF SPECIFIC SITES, I.E., DRY-SITE VERSUS FRESH WATER OR SALT WATER COOLING, ETC.

IT WOULD SEEM LOGICAL, MR. CHAIRMAN, THAT HAD S. 2073 BEEN IN EFFECT TODAY, THE NUCLEAR STEAM SUPPLY SYSTEM AND BALANCE OF PLANT ASSOCIATED WITH PALO VERDE WOULD BE THE FUNCTIONAL MODEL FOR STANDARDIZATION. HAVING SURVIVED EXTENSIVE HEARINGS ON THE PLANT'S DESIGN, CONSTRUCTION AND OPERATION, WE WOULD HAVE A NUCLEAR PLANT SYSTEM CAPABLE OF BEING BOXED AND PACKAGED FOR PURCHASE BY UTILITIES ACROSS THE NATION WITH MINIMAL CHANGES OR ADAPTATIONS TO LOCAL CONDITIONS. FOR THIS SCENARIO TO COME TO PASS, HOWEVER, THE NUCLEAR ENERGY INDUSTRY IS IN NEED OF LEGISLATION, SUCH AS S. 2073, WHICH WOULD SPUR THE REFORM NEEDED TO MAINTAIN THE NUCLEAR OPTION.

S. 2073 AFFORDS THE PUBLIC AMPLE OPPORTUNITY FOR REVIEW, COMMENT AND PARTICIPATION IN HEARINGS UNDER VERY REASONABLE CIRCUMSTANCES. THIS BILL ALLOWS FOR REDUCING LEAD TIMES THROUGH THE PRE-APPROVAL PROCESS, THEREBY LIMITING THE BURDEN OF RELITIGATING THE SAME PLANT DESIGN ISSUES OVER AND OVER AGAIN AT EACH NEW SITE.

THE GENIUS OF S. 2073, MR. CHAIRMAN, IS THAT THE LEGISLATION DRIVES STANDARDIZATION BY ALLOWING THE NRC TO ISSUE COMBINED CONSTRUCTION PERMITS AND OPERATING LICENSES IN WHAT IS CALLED A "COL". It ALSO ENCOURAGES STANDARDIZATION BY DIRECTING THE COMMISSION TO ESTABLISH PROCEDURES FOR LICENSING STANDARD DESIGNS INDEPENDENT OF WHETHER A UTILITY ORDER EXISTS AT THE TIME OR NOT. LICENSING A DESIGN UNDER S. 2073 WOULD REQUIRE A PUBLIC HEARING. THE LEGISLATION ALSO DIRECTS THE NRC TO ESTABLISH PROCEDURES TO PRE-APPROVE, AFTER PUBLIC HEARINGS, NUCLEAR POWER PLANT SITES.

AS A UTILITY EXECUTIVE WITH EXPERIENCE IN NUCLEAR ENERGY, I APPROVE OF THE FACT THAT S. 2073 DOES NOT REMOVE STRICT REGULATORY OVERSIGHT: THE BILL "FRONT LOADS" A GOOD BIT OF IT, HOWEVER, AND SHIFTS MORE OF THE REGULATORY BURDEN TO NUCLEAR POWER PLANT EQUIPMENT VENDORS AND ARCHITECT-ENGINEERS WHO MUST FACE THE NRC OVERSIGHT AND HEARINGS PROCESS BEFORE A UTILITY EVER ENTERS THE PICTURE. WE WOULD FACE THE NRC AND A PUBLIC HEARING WHEN WE APPLY FOR A "COL" TO BUILD A PRELICENSED PLANT. BY THEN, MANY IF NOT MOST, SAFETY ISSUES WILL HAVE BEEN RESOLVED.

I REMARKED EARLIER THAT A "COL" DRIVES STANDARDIZATION, AND I'D LIKE TO TAKE JUST A MOMENT TO EXPLAIN WHAT I MEANT. IN ORDER TO ISSUE A "COL" THE NRC WOULD HAVE TO HAVE COMPLETE DESIGN INFORMATION NECESSARY TO DETERMINE THAT A PLANT COULD BE BUILT AND OPERATED SAFELY. PROVIDING A COMPLETE DESIGN FOR A "COL" APPLICATION WILL INCREASE FRONT END COST. CONTROL OF THESE INITIAL COSTS WILL DRIVE STANDARDIZATION OF DESIGNS.

LET ME ADDRESS ONE OTHER NEED UTILITY EXECUTIVES HAVE BEFORE A COMPANY LIKE APS CONSIDERS ORDERING ANOTHER NUCLEAR UNIT. WE NEED TO HAVE GREATER PUBLIC CONFIDENCE IN NUCLEAR POWER BY MAKING PUBLIC PARTICIPATION IN PLANT LICENSING AND CONSTRUCTION DECISIONS MORE MEANINGFUL. I BELIEVE THAT THIS PROCESS IS MUCH IMPROVED UNDER THE PROVISIONS OF S. 2073. IN THE CASE OF THE PRESENT TWO-STAGE LICENSING PROCESS, THE NRC'S SPECIAL INQUIRY GROUP WHICH INVESTIGATED THE TMI ACCIDENT (THE ROGOVIN GROUP)

CONCLUDED THAT THE FIRST PUBLIC HEARING IS HELD "TOO EARLY TO BE USEFUL, AND THE OTHER IS TOO LATE TO BE FULLY EFFECTIVE". ACCORDINGLY, BOTH THE ROGOVIN GROUP AND THE KEMENY COMMISSION URGED CONGRESS TO ABOLISH THE TWO-STEP PROCESS.

BY CONTRAST, S. 2073'S "COL" PROVISION TELLS THE PUBLIC AND THE UTILITY - UPFRONT - EXACTLY WHAT IS GOING TO BE REQUIRED TO ASURE SAFE CONSTRUCTION AND OPERATING PROCEDURES. CRITICAL IN S. 2073 IS THAT A "COL" ISSUED TO A UTILITY WOULD SPECIFY ALL "INSPECTIONS, TESTS, ANALYSES AND ACCEPTANCE CRITERIA" THAT WOULD HAVE TO BE USED TO ASSURE QUALITY CONSTRUCTION. SINCE "COL" IS A LICENSE THAT COULD ONLY BE ISSUED AFTER A PUBLIC HEARING, THE PUBLIC WOULD KNOW BEFORE ANY CONCRETE WAS POURED EXACTLY HOW THE PROPOSED NUCLEAR POWER PLANT WOULD BE TESTED FOR SAFETY, AND HOW THE VALIDITY OF THOSE TESTS WOULD BE JUDGED OR ACCEPTED.

I'D LIKE TO CONCLUDE MY PREPARED TESTIMONY BY RECOGNIZING THAT SOME PEOPLE WHO PROFESS TO FAVOR NUCLEAR POWER PLANT STANDARDIZATION DO NOT BELIEVE THAT LEGISLATION LIKE S. 2073 IS NECESSARY. I'VE HEARD IT ARGUED THAT THE NRC COULD SIMPLY ISSUE AN ADMINISTRATIVE RULE REQUIRING ESSENTIALLY COMPLETE STANDARDIZED DESIGNS BEOFRE A CONSTRUCTION PERMIT IS ISSUED IN TODAY'S TWO-STEP PROCESS.

THIS POSITION MAY THEORETICALLY BE TRUE, BUT IT IS ALSO MEANINGLESS. VENDORS AND ESPECIALLY ARCHITECT-ENGINEERS WOULD BE ASKED TO INVEST HUGE SUMS OF MONEY UP-FRONT WHILE KNOWING THAT THE NRC COULD CONTINUE TO ORDER EXPENSIVE CHANGES AT ANY TIME. UTILITIES WOULD BE ASKED TO CONCONSTRUCT "STANDARD" PLANTS THAT WILL NOT STAY STANDARDIZED VERY LONG, UNLESS THERE IS LEGISLATIVE AUTHORITY FOR REGULATORY STABILITY DURING CONSTRUCTION. IN SHORT, AN NRC RULE WITHOUT LEGISLATION WOULD BE A NON-STARTER BECAUSE IT WOULD NOT GIVE COMPANIES LIKE APS THE CONFIDENCE WE NEED TO ONCE AGAIN MAKE LONG-TERM INVESTMENTS IN NUCLEAR ENERGY. WE HAVE MORE FAITH IN THE STABILITY OF LAWS THAN WE HAVE IN AGENCY RULES BY THEMSELVES.

MR. CHAIRMAN, S. 2073 WILL NOT SOLVE EVERY PROBLEM OR PLEASE EVERY COMPANY OR INTEVENOR, BUT IF THIS CONGRESS AND THIS COUNTRY WANTS IN ANY WAY TO MAINTAIN A NUCLEAR OPTION FOR THE 1990'S AND BEYOND, THEN THE TIME TO BEGIN IS NOW AND THE PLACE TO START IS WITH S. 2073.

THANK YOU.

The CHAIRMAN. Thank you very much, Mr. Turley.
Mr. Priory.

STATEMENT OF RICHARD P. PRIORY, VICE PRESIDENT, DESIGN ENGINEERING, DUKE POWER CO.

Mr. PRIORY. Thank you, Mr. Chairman. My name is Richard P. Priory. I am vice president, design engineering, for Duke Power Co. I would like to thank the committee for the opportunity to appear here before you today to present testimony in support of several concepts of regulatory reform contained in the proposed legislation, in particular the concepts of nuclear plant standardization and preapproved design, early site approval, combined construction and operating licenses, and stabilizing changes to regulatory requirements.

I appear here today representing Duke Power Co. and also the atomic industrial forum's study group on the practical application of standardized nuclear powerplants in the United States. I am chairman of that organization's working group on design information requirements.

My comments are based on the knowledge gained through Duke Power Co.'s experience with nuclear power. We are currently operating six large nuclear units, with a seventh scheduled to come into service later this year.

More significantly, however, at least for the purposes of my testimony here today, Duke is unique in the investor and utility industry in this country because we have designed, engineered and constructed all of our nuclear units. I therefore can speak from the perspective of not only a utility which operates nuclear powerplants but also the architect and engineering and constructor of those plants. We have also worked with three of the four nuclear steam supply system vendors.

I believe that the approach contained in this legislation represents a significantly different, more rational method of regulating, designing and constructing nuclear powerplants in this country. These legislative concepts will provide for a stabilized engineering and regulatory environment in which the design engineering is essentially complete. The regulatory process is thoroughly defined, and public input is incorporated before the construction of the plant begins.

I would like to focus on two key areas which I believe must be understood for meaningful legislation to result. One, the advantages of coupling standardization with licensing reform, for in my view the two must be dealt with together; and two, the design engineering that will be completed prior to obtaining a combined construction and operating license.

Standardization in conjunction with single-stage licensing and stable regulatory requirements will be a significant first step in reviving the nuclear option in this country.

First, safety will be enhanced since industry and NRC resources can be focused on optimizing a smaller number of designs, and construction of these plants could proceed with a minimum of disruption.

Second, cost of nuclear plants will decrease because more discipline is brought to the engineering and regulatory process. Construction times can be shortened and investor confidence restored.

Third, public participation in the process will be enhanced in that the public will have more detailed design information to review at the beginning of the process when public input is most beneficial.

In order to obtain the combined construction and operating licenses, a substantial financial commitment will be required by the applicant. I estimate this up-front commitment to be in the range of $150 to $200 million. This is roughly 10 times the investment required to submit a construction permit under current regulations.

We believe that to support the NRC review and approval of the combined construction and operating license application, the plant design must be sufficiently complete to provide the NRC the necessary information to make the requisite safety determination.

Methodology for procedures and testing, inspections and analysis, along with acceptance criteria, will be required up front and approved as part of the construction and operating license.

The design engineering products necessary to support the license application are detailed in my written statement. The large front-end investment required to support this approach will represent significant financial risk to the industry and also the investment community. We believe this risk will be balanced by the stabilizing features contained in the proposed legislation.

We urge this committee to move expeditiously to report a nuclear standardization licensing bill. Senate bill S. 2073 provides a sound framework for effective nuclear licensing reform. Planning to meet the energy needs of the 1990's requires near-term utility decisions on viable electric generating technologies. Under the current regulatory process, nuclear power is no longer a viable option for use by utilities in providing future generating capacity.

This legislation offers many of the necessary ingredients to restore this generation option for this country. It would enhance public safety, lower cost to the customer, provide for early public participation, reduce investment risks, and eliminate much of the waste and inefficiency present in the current process.

In summary, these legislative concepts offer the best hope for restoration of a viable nuclear option. Thank you for the opportunity to appear before this committee. I will be pleased to answer any questions.

[The prepared statement of Mr. Priory follows:]

STATEMENT
OF
RICHARD P. PRIORY
ON
S2073 - NUCLEAR FACILITY STANDARDIZATION ACT OF 1986
BEFORE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
SENATE OF THE UNITED STATES
APRIL 22, 1986

I. Introduction

My name is Richard B. Priory. I am Vice President, Design Engineering, of Duke Power Company. I appreciate your invitation to appear before this Committee. I am a member of the Atomic Industrial Forum's (AIF) Study Group on the Practical Application of Standardized Nuclear Power Plants in the United States and Chairman of its Working Group on Design Information Requirements.

I am here today representing Duke power Company. On December 10, 1985, I appeared before the U.S. House of Representatives, Subcommittee on Energy, Conservation and Power and presented a similar written statement on behalf of the AIF Study Group. That statement was also supported by the Edison Electric Institute (EEI) and the American Nuclear Energy Council (ANEC).

Nuclear power is a significant and growing component of power supply both here in the United States and throughout the world. During 1985, more than 370 nuclear generating units provided about 15 percent of the world's electricity. Nuclear generating capacity in commercial service worldwide totals 248 million kilowatts. The United States is by far the largest producer with about one-third of the worldwide total.

In 1985, 90 commercial nuclear plants supplied nearly 15.5 percent of our nation's electricity. This represented an increase of 16.6 percent over nuclear production during 1984. According to Department of Energy figures the comparable increase in electrical production from all other sources in 1985 was 2.2 percent. Nuclear's share of total electricity production in the U.S. is expected to rise to nearly 20 percent by 1990, when most of the nuclear plants currently under construction have begun operation.

In some areas of the country, nuclear power's contribution to the electric power supply is much greater. For example, Duke Power Company, with a service area encompassing the Piedmont region of North and South Carolina, operates six large nuclear units. Duke's seventh reactor is scheduled to come into service in the fall of this year. These nuclear units produce in excess of 50 percent of the electricity for our service area. At Duke, nuclear power is our lowest-cost steam-electric generation.

With the U.S. economy expanding and demand for electricity on the rise, utilities are now planning for new generating capacity that will be needed in the 1990's and beyond. Unfortunately, from a business perspective, nuclear power is perceived by the industry and the investment community as an economically risky investment, expensive, and requiring too much time to license and construct a plant to be considered a competitive generation alternative. A major contributor to this situation is the current licensing process which is both unstable and unpredictable.

The nuclear industry testified in 1983 in both the House and the Senate on earlier versions of the NRC and DOE licensing reform bills. In addition, Wallace B. Behnke, Vice Chairman of Commonwealth Edison Company, and Barton Z. Cowan, partner in the law firm of Eckert, Seamans, Cherin and Mellott, and Chairman of the AIF Lawyers Committee, presented testimony on licensing reform on behalf of the AIF, EEI, and ANEC in mid-July of 1985 before the Senate Environment and Public Works Committee. On July 25, 1985, the House Subcommittee on Energy, Conservation and Power held a hearing during which several senior members of our industry testified. On December 10, 1985, a second hearing was held by the House Subcommittee on Energy, Conservation and Power to develop the record further. While the particulars of the pending legislative proposals differ, the industry considers all of the bills to be a good starting point for consideration of improvements in the present licensing environment. We believe that the record established to date taken together with the record developed here today provides sufficient information for this committee to move expeditiously to proceed to markup. We strongly urge you to do so now. As I just noted, utilities are now beginning to plan to add their next increment of generating capacity to meet forecasted load; without the changes we discuss here today I doubt that nuclear power will be seriously considered by any utility as a realistic option.

My statement today will concentrate on proposed revisions to the current licensing process which may alleviate this condition. In addition safety, costs, and public participation may also be enhanced. In particular, I will address the Design Certification and combined Construction and Operating License processes. In doing this, I will describe the information which the industry anticipates will be available to support an application for a Design Certification. I believe that the proposal which I will discuss with you today represents a fresh approach to a matter which all of us -- the utility industry, vendors, the NRC, the public, and the Congress -- have been working on for the past several years.

II. AIF Study Group on the Practical Application of Standardized Nuclear Power Plants in the United States

An executive-level AIF Study Group on the Practical Application of Standardized Nuclear Power Plants in the United States was formed early in 1985 to help obtain the practical benefits of standardization as soon as possible and to help remove roadblocks to its effective implementation.

The Study Group has made iterative reviews of the output of two active working groups; the Working Group on Regulatory Interactions, chaired by Mr. James Rhodes, Senior Vice President, Virginia Power Company; and my Working Group on Design Information Requirements. The combined efforts of these groups was the development of a position paper on standardization which was sent to the Nuclear Regulatory Commission on March 20, 1986. The document reflected the collective judgement of the industry and demonstrated the high level of interest throughout the industry in achieving a workable standardization process.

The position paper prepared by the Study Group recognizes the need for existing licensing options such as Preliminary Design Approvals, Final Design Approvals, Duplicate Plants, Replicate Plants, and Manufacturing Licenses to allow the industry to build on experience gained as a result of 30 years of commercial nuclear power. The industry views these as vital elements in a period of transition as we move toward the Design Certification (DC) and combined Construction and Operating License (COL) processes. My presentation today will not address the existing licensing options since they have been discussed with the ACRS, the NRC Staff, the NRC Commissioners, and Congress many times in the past. Instead I will concentrate my discussion on the DC and COL concepts contained in the position paper. The printed version of the AIF "Position Paper on Standardization" is attached to my written testimony and we request that it be included in the record.

III. The Design Certification and Combined Construction Permit and Operating License Processes

It is appropriate at this point to describe the first element of the proposal, the Design Certification process. In my opinion, designs for standard plants would be developed by consortiums made up of utilities, NSSS vendors, turbine generator vendors, AEs, constructors, etc. Necessary information would then be submitted to the NRC, via a document called a Plant Safety Report (PSR) for review and approval. The approval of the design would result in the Design Certification which would be effective for a period of 10 years with renewal options. The objective of the Design Certification Process is to arrive at a detailed plant design which completely satisfies regulatory requirements -- license it -- and then "freeze" it!

To receive a Design Certification, the design must be sufficiently complete so that the applicant and the NRC have a clear definition of all relevant safety aspects and features. The NRC review would assure that construction, inspection, and testing can be performed in accordance with preapproved methodology and procedures and measured against preapproved acceptance criteria. Accordingly, the following information would be contained in the PSR:

- Design Basis Criteria
- Analysis and Design Methods
- Functional Design and Physical Arrangement of Auxiliary, Balance of Plant and Nuclear Steam Supply Systems
- Plant Physical Arrangement Sufficient to Accommodate Systems and Components
- Acceptance/Test Requirements
- Probabilistic Risk Assessment Methodology

The Commission and applicant would determine the level of detail necessary to make requisite safety findings and the applicable inspections, tests, analyses and acceptance criteria. Name plate level information would not be available, however, the design detail would support equipment procurement and include qualification, installation, and testing procedures fully defining the requirements for implementation of the detailed design.

The DC process is definitely not "business as usual" but represents a significantly different method of design, construction, and regulation of nuclear power plants. In the past, design information of a more preliminary nature was furnished on the front end of the licensing process leaving open the potential for significant changes during construction or at the OL stage. There is something basically wrong with debating design criteria after plant construction is essentially complete. In the DC process, Design Engineering is essentially complete, the regulatory requirements are thoroughly defined and public input has been incorporated before construction of the plant begins.

The essentially complete design developed as part of the DC process would encompass, as appropriate, the following documents, drawings, and information:

- Design Basis Criteria
- Plant General Arrangements of Structures and Components
- Process and Instrumentation Diagrams
- Control Logic Diagrams
- System Functional Descriptions
- Component and Procurement Specifications including Acceptance Test Requirements
- Construction and Installation Specifications
- QA Program
- Emergency Plans
- Security Plans
- ALARA/Radiation Protection Plan
- Accident Analysis
- Draft Technical Specifications
- Risk Analysis

The aforementioned information would be prepared as part of the DC application process and would subsequently be used for construction and operation of the facility. Documents required to complete the NRC safety evaluation would be provided along with the PSR as part of the DC application. As I have indicated, the plant design would be essentially complete before submittal of the PSR to the NRC. The only plant design remaining, beyond this point, would be associated with site specific verification and with incorporating equipment name plate information into the design once the construction process has started. The DC work required will result in a large expenditure of capital on the part of the group developing the standard plant design. In fact, I estimate these expenditures to be in the range of 150 to 200 million dollars.

But, as I previously indicated, there is another integral part of the proposal. The keystone to the effectiveness of the

Design Certification process is its coupling with a combined Construction and Operating License. A Design Certification by itself will not reduce investment risk to levels which will make nuclear competitive with other available generation alternatives. Without a COL as a part of the overall revised process, it is my view that we will not obtain the benefits of the Design Certification because it is doubtful that utilities or the investment community would ever again run the risk of constructing a plant without a high degree of assurance that it would operate when it was completed.

In the COL process, the opportunity for public participation will be maintained consistent with the intent of the Code of Federal Regulations. Discussion of the adequacy of the plant design will occur at the time of the DC and site specific issues will be considered at the COL stage.

After the COL has been granted, a series of confirmatory audits will occur as the plant is built. These audits will assure that the plant has been constructed consistent with pre-approved criteria and that the owner has satisfactorily completed needed tests and inspections. Upon completion, the NRC would finalize the audit and the plant would begin operation. The net result of the process is a significant move toward performance regulation in all aspects and away from the prescriptive regulation which characterizes the existing program.

IV. The Benefits

A major benefit of the processes I have discussed today, is that they will allow nuclear power to effectively compete with other generation alternatives. We believe this will occur because an effective and efficient licensing process will contribute significantly to a reduction in the real cost of nuclear power. This reduction in cost will occur in two significant ways:

1. The cost of borrowed funds for a utility will be reduced. This will happen because investors and lenders will perceive that once a DC and a COL have been obtained, project progression will be stable and predictable and investment risk reduced substantially. Along with this perceived reduction of risk will be a real reduction in the cost of borrowed funds.

2. The time from initiation of construction to operation will be reduced. This will happen because the design will be essentially complete and regulatory requirements defined and stabilized prior to initiation of construction. This will result in minimum rework on the project, designs will be

optimized and construction management enhanced. The reduction in construction time will significantly reduce costs associated with escalation and finance charges for the project.

The proposals will also enhances public participation in the licensing process. As I previously indicated, opportunity for public participation concerning the adequacy of plant design is available during the DC proceedings. Public participation will be more useful and able to explore technical issues to a greater depth than is now possible at the construction permit stage since the detailed design will be essentially complete. At the COL stage, the public can participate regarding site related matters. This process will allow the public to provide input at a stage when such participation is most meaningful, before commencement of construction is authorized.

These processes will also enhance safety and better utilize industry and regulatory personnel. It will allow the NRC, reactor vendors, designers, architect engineers, and utilities to concentrate on key issues involved in fewer designs. The processes will eliminate the substantial demands on these technical resources now caused by changing criteria.

The added stability of the engineering, construction, and regulatory processes and shortened construction time will enable utilities to plan new plants more reliably. Utilities will be better able to predict real costs and effectively match capacity additions with growing customer demand.

V. Summary

In summary, I have described nuclear power's excellent track record. I have also indicated that nuclear does not appear to be a competitive generation alternative for the future under the current licensing process.

The industry has proposed licensing reform which utilizes the concepts of DC and COL. I have elaborated on the design information which will be completed and available to the NRC at the time of the DC, and described how these processes would work.

The DC and COL processes are intended to provide a first step toward reviving nuclear power as a competitive generation alternative for this country. This will occur through the reduction of costs associated with nuclear power and restoring the public confidence in our ability to design, regulate, construct and operate these facilities safely, responsibly, and predictably. I believe that this kind of licensing reform is essential to maintain a viable nuclear power option.

I urge your Committee to move expeditiously to report a nuclear standardization and licensing bill based on the provisions of S2073, which we believe provide a sound framework for obtaining effective nuclear licensing reform. Thank you for the opportunity to appear before your committee.

Position Paper on Standardization

Prepared by

AIF Study Group
on the
Practical Application of Standardized
Nuclear Power Plants in the United States

March 1986

Atomic Industrial Forum, Inc.
7101 Wisconsin Avenue
Bethesda, MD 20814-4891

PREFACE

This AIF "Position Paper on Standardization" was derived from an earlier draft prepared by an AIF Special Working Group chaired by Dr. J.T. Rhodes and comprised of Messrs. A.C. Bivens, G.L. Chipman, H.M. Fontecilla, C.L. Reid, R.B. Bradbury, G.A. Davis, W.J. Johnson and M.S. Tully. Special effort was devoted by Mr. Fontecilla who took on the responsibility for the detailed development and editing of the Position Paper.

The earlier draft was reviewed thoroughly by the AIF Study Group on the Practical Application of Standardized Nuclear Power Plants in the United States, most recently at its March 19, 1986, meeting. The resulting Position Paper benefited greatly from this review as well as from prior Study Group input. It is important to make clear up-front that the Study Group's ultimate objective is to obtain a process that leads to approval, reference and multiple use of Design Certifications (DC) in Construction and Operating License (COL) proceedings. The Position Paper also indicates a need to maintain current available options while the process for implementing this ultimate objective is being put in place.

This "Position Paper on Standardization" was transmitted in AIF President Carl Walske's March 20, 1986, letter to NRC Chairman Palladino, which is appended to the report. We believe our Position Paper is needed now and should serve as a reference point for discussions between industry and government officials on the regulatory aspects of standardization.

Robert A. Szalay
Senior Vice President
Atomic Industrial Forum, Inc.

TABLE OF CONTENTS

Page

Executive Summary 1
Introduction 3
Background 4
Reference System Concept 5
  A. PDAs 5
  B. FDAs 6
  C. DCs 6
Standardization Options in Commission's 1978 Policy Statement 7
Design Information Requirements for FDA and DC Applications 7
Changes to Standard Designs 8
License Fees 10
AIF March 20, 1986, Letter to Chairman Palladino 11
AIF Study Group Membership Listing 13

AIF POSITION PAPER ON STANDARDIZATION

EXECUTIVE SUMMARY

This Position Paper describes proposed policies and actions that, if implemented by the Nuclear Regulatory Commission, are expected to encourage and support the development of standard nuclear power plants in the United States. It was developed by the AIF Study Group on the Practical Application of Standardized Nuclear Power Plants in the United States, with general support from EEI, EPRI, NUMARC and ANEC.

The NRC has had in effect policies and regulations addressing standard designs for over ten years. However, it is believed that these policies and regulations need to be updated, expanded, and reiterated in order to revitalize and improve the process by which standard designs are reviewed and approved.

The future use of standard nuclear power plants is expected to depend on the successful development and acceptance of preapproved reference designs, in particular Design Certifications. It is the Study Group's belief that the institution of Design Certifications and the improvements in the existing preapproved design processes described in this Position Paper, when combined with a hearing process which facilitates licensing decisions at the earliest feasible phase of the licensing process, will provide the regulatory conditions necessary to achieve standardization. By this we mean the use of a Design Certification (DC) in a Construction and Operating License (COL) proceeding.

However, the Study Group also recognizes that other existing standardization options, such as duplication and replication, will continue to be attractive in the near future. These options offer many of the benefits of standard plants and are not in conflict with, and would not detract from, the standardization goals shared by the industry and the NRC.

This Position Paper addresses a variety of aspects regarding standard designs and urges the Commission to take certain actions. All these actions are believed necessary to implement a comprehensive and successful standardization policy.

INTRODUCTION

The Nuclear Regulatory Commission has indicated on several occasions that it recognizes that its fundamental mission is to regulate those who commercially use or produce nuclear material so that the public health and safety, the common defense and security, and the environment are adequately protected. However, the Commission is aware that its actions can affect the nation's energy mix and interdependent energy supply system of which nuclear energy is a significant part. While we recognize that the Commission's functions do not include the promotion of nuclear energy, the way the NRC carries out its fundamental mission must be consistent with, and complementary to, the determination of the Congress that the safe use of nuclear energy for peaceful purposes, particularly in the production of electricity, is a legitimate and important national goal.

Regulatory predictability and stability are extremely important to maintaining overall safety and the statutory goal of supporting the expansion of the peaceful uses of nuclear energy. To this end the Commission has undertaken a series of actions, including the proposal of regulatory reform legislation, the issuance of the policy statement on severe accidents, and the backfit rule. Consistent with its goal to achieve stability in the licensing process, we urge the Commission to continue to work with the nuclear industry to develop and use standardized designs including standardized nuclear steam supply system (NSSS) and balance of plant (BOP) designs. We agree with the Commission's belief that there is a need to encourage the development and use of standardized nuclear power plant designs because such designs can benefit the public health and safety by concentrating the resources of designers, engineers and vendors on particular approaches, by stimulating standardized programs of construction practice and quality assurance, by improving the training of personnel, by fostering more effective maintenance and improved operations, and by increasing the effectiveness of public participation. Standardization will also allow for a more expeditious and efficient review process and a better understanding of the designs by the regulatory staff.

The Commission has proposed to Congress legislation regarding regulatory reform and standardization. Although we believe that the policies recommended in this paper have the potential to substantially improve the review and licensing process to which standard design applications will be subject in the future, we continue to believe that legislation is necessary to create an environment supportive of the development and deployment of nuclear power in order to obtain the full benefits of standardization. While the actions described in this paper are independent of the proposed legislation, they are consistent with and in direct support of it. It cannot be overemphasized that both a Congressional mandate and the actions described in this paper are necessary to accomplish *all* of the goals regarding standardization and licensing reform.

The preapproval of designs which can be referenced in individual plant applications must be the cornerstone of any standardization policy. In order to provide a means for additional regulatory stability, the Commission has indicated that it will grant Design Certifications in addition to Preliminary and Final Design Approvals. Design Certifications will not be subject to challenge in individual licensing hearings. We believe that, ultimately, certified designs will become the most favored by the industry.

To obtain the benefits of standardization, however, certain other Commission actions and directions are desirable. First, standard design applications should be reviewed and approved expeditiously even in the absence of a reference application. Second, standardization will not be achieved if the reference designs are changed in an undisciplined manner or are rereviewed and backfitted after they have been approved. Accordingly, application of the backfit rule must be an integral part of the standardization policy. Further, the NRC staff should be directed not to rereview any feature of an approved standard design unless it determines, based on significant new information, that the design will not provide reasonable assurance of adequate protection of the public health and safety or of the common defense and security. Third, the Commission should assign a senior manager responsible to the Commission for the effective implementation of its standardization policy. Fourth, the Commission should review and modify its regulations to provide that once construction and use of a standardized design has been authorized in a reference application after an opportunity for a hearing has been provided, licensing issues are not subject to further adjudication in the absence of good cause as defined by the Commission in its 1985 proposed legislation to the Congress.

In the immediate future, while standard designs are developed and approvals and certifications are granted, the options of duplication, replication, and manufacturing license should be maintained. Experience to date with duplicate and replicate plants has been favorable, and it is reasonable to expect that these options will continue to be utilized by the industry. Although these options may be phased out as preapproved reference designs become the norm, they provide many of the advantages of standard designs. As with reference designs, the staff should utilize and rely upon prior reviews and approvals to the maximum extent possible in the review of duplicate, replicate, and manufacturing license applications. Previously approved designs should not be rereviewed unless significant new information indicates that the design will not provide reasonable assurance of adequate protection of the public health and safety or of the common defense and security.

We are well aware of the need and value of well-defined review guidelines, and support the cooperative efforts by the NRC staff, the Electric Power Research Institute (EPRI) and others in the preparation of such review guidelines to be used on standard design applications. We also will continue to interact with the NRC staff in the development of guidance regarding the design information to be included in applications for Final Design Approvals and Design Certifications. We see these interactions as consistent with the significant past and ongoing efforts by the NRC and the nuclear industry to address the detailed issues so important to a successful standardization program.

In the past, standard design approvals have been issued for periods of three or five years. These periods were selected considering the number of plant license applications anticipated at the time, the experience of changes in safety requirements that were then occurring with time, and the relative newness of the concepts. Since the last policy statement addressing standardization, significant experience has been gained with standard designs, and it is now apparent that the period of effectiveness used to date for the different standardization options is unnecessarily restrictive. It limits the ability of participants in the overall design of a plant to develop their portions of the plant designs well before the approval for other sections of the design terminate (e.g., an architect-engineer developing a BOP design to mate with an approved NSSS design), and thus obtain a reasonable return on investment by use of the design in one or more plants. Considering these factors, the significantly increased confidence in the safety of nuclear plants, and the stability in licensing requirements expected in the future, we recommend that the Commission extend to 10 years the life term for all standardization options with possible extensions beyond the 10-year period.

We also believe that there is no reason to retain the limitation of 10 units on the number of plants that can be manufactured under a manufacturing license. No such limit exists, or is deemed necessary, for the issuance of design approvals or certifications and the same should apply to the manufacturing licenses.

As a further action to encourage the development of standard designs, the Commission is asked to defer filing and issuance fees for applications for standard design approvals and certifications.

BACKGROUND

The initial policy statement on standardization of nuclear power plants was issued by the Atomic Energy Commission (AEC) in April 1972. In March 1973, the AEC announced the staff's readiness to implement the standardization policy utilizing three distinct concepts; namely, the manufacturing license concept, the duplicate plant concept, and the reference system concept. In August 1974, the AEC announced that the replicate plant concept would be acceptable as another standardization option. The AEC was abolished and its regulatory responsibilities assigned to the newly formed Nuclear Regulatory Commission on January 19, 1975. On August 31, 1978, the Commission issued a statement that reaffirmed its support of standardization and provided more detailed guidance for its implementation. Consistent with these policies the Commission promulgated Appendix M to 10 CFR Part 50, "Standardization of Design; Manufacture of Nuclear Power Reactors; Construction and Operation of Nuclear Power Reactors Manufactured Pursuant to Commission

License," in November 1973; Appendix N, "Standardization of Nuclear Power Plant Designs: Licenses to Construct and Operate Nuclear Power Reactors of Duplicate Design at Multiple Sites," in January 1975; and Appendix O, "Standardization of Design: Staff Review of Standard Designs," in January 1975.

After the initial AEC announcement in March 1973 of the staff's readiness to implement the standardization policy, industry acted positively to utilize the various standardization options, although this may not be readily apparent due to plant cancellations in recent years. In the years 1973 through 1977, over half of the applications for construction permits involved one or more of the standardization options. In those years the Commission received no fewer than 18 applications for Preliminary Design Approvals.

No Preliminary Design Approval remains in effect at the present time. Final Design Approvals were issued in 1983 to the General Electric Company's BWR/6 nuclear island design, GESSAR II, and to Combustion Engineering Incorporated's System 80 design, CESSAR. In May 1984 an application was docketed for Westinghouse Electric Corporation's advanced pressurized water reactor design RESARSP/90. Also, work continues between the NRC and the EPRI on their "Advanced LWR Program" to establish design and licensing criteria for future plants.

On several occasions since 1982, the Commission has proposed to the Congress legislation addressing standardization and licensing reform. The most recent proposal was introduced in the Senate by Mr. Simpson as S.836, and in the House by Mr. Udall as H.R.1447. These bills would facilitate the use of preapproved sites and designs and the development and use of standardized designs, would provide for issuance of a combined license to construct and operate, and would improve regulatory stability.

In the recent past the Commission has proceeded vigorously towards the resolution of generic safety issues, has implemented its safety goal concepts on a trial basis, and has issued the backfit rule and policy statements on advanced reactors and on severe accidents. All these actions, together with the accumulated experience of nearly 100 operating plants, indicate that the industry and the Commission have reached a high level of maturity and confidence in the overall safety of nuclear power. As a result, the Commission is in the process of shifting its regulatory emphasis away from detailed, prescriptive requirements toward performance criteria. We believe that this approach will result in more effective regulation.

It is on the basis of this experience and maturity that we urge the Commission to endorse the regulatory actions described in this Position Paper in order to encourage and assist the industry in the pursuit of standardization.

REFERENCE SYSTEM CONCEPT

The reference system concept involves the approval of a standard design for a nuclear power plant, or a major subsystem which represents a discrete element of a nuclear power plant, outside of the context of an application for a Construction Permit (CP), an Operating License (OL), or a Construction and Operating License (COL). Applicants have the flexibility to seek a Preliminary Design Approval (PDA), a Final Design Approval (FDA), or a Design Certification (DC). PDAs and FDAs are issued following the completion of the staff and Advisory Committee on Reactor Safeguards (ACRS) review and would be subject to challenge in later licensing proceedings according to the Commission rules and regulations. DCs will be issued by the Commission following appropriate regulatory proceedings and will not be subject to challenge in individual licensing proceedings.

A. Preliminary Design Approvals

In accordance with the Commission regulations and policies, a reference design can be submitted for approval first as a preliminary design in an application for a PDA, and then as a final design in an application for an FDA. A PDA is not, however, a prerequisite for an FDA.

We consider the PDA a useful process by which a design may be reviewed and approved at a stage when changes and modifications are more easily and effectively accomplished. At the same time, the staff approval will provide the designer with a high level of regulatory stability before the substantial efforts needed for the final design are expended. In the future, we expect that PDAs will be sought mainly with the purpose of obtaining the staff's concurrence with the design characteristics, with less emphasis on the purpose of referencing the preliminary design in new CP applications.

PDAs should be conclusive on matters encompassed therein with respect to staff and ACRS reviews of further applications and should be utilized by and relied upon by the staff and ACRS in their review of such applications which incorporate by reference the PDA.

PDA applications will be expected to address the criteria and procedural requirements described in the Commission's policy statement on severe accidents to the extent that it is reasonably possible and considering the scope and level of detail of the design. The level of design information in PDA applications should be comparable to the information provided in CP applications (as prescribed in Regulatory Guide 1.70, "Standard Format and Contents of Safety Analysis Reports For Nuclear Power Plants").

PDAs may be referenced from their date of docketing and should be effective for periods of 10 years from issuance of the PDA. The expiration of a PDA should not affect the use of a reference design in applications that referenced the approval prior to its expiration.

B. Final Design Approvals

In accordance with the Commission regulations and policies, a final reference design can be submitted in an application for an FDA if it contains sufficient design information to enable the staff to reach a conclusion on matters encompassed therein that construction and operation of a facility utilizing the reference design will provide reasonable assurance of adequate protection of the health and safety of the public and of the common defense and security. Applicants may apply directly for an FDA, or may apply first for a PDA. FDAs may be referenced in DC proceedings, and in CP and COL applications. In addition, FDAs may be referenced in OL applications which made reference to the FDA or the corresponding PDA at the CP stage.

FDA applications will address the criteria and procedural requirements described in the Commission's policy statement on severe accidents to the extent that it is reasonably possible considering the scope of the design.

FDAs may be referenced from their date of docketing and should be effective for periods of 10 years from issuance of the FDA. In addition, FDA holders should be allowed to request renewals of their approvals. These requests would be submitted no earlier than 36 months prior to the expiration date of the approval. The staff would be expected to grant these renewals for an additional period of time no less than five, nor more than 10 years, unless it determines, based on significant new information, that the design will not comply with the Commission's regulations for the protection of the public health and safety or the common defense and security, applied in accordance with the Commission's backfit rule. Original FDAs should remain in effect while awaiting staff issuance of the renewals, and the expiration of an FDA should not affect the use of a reference design in applications that referenced the approval prior to its expiration. OL applications should be allowed to reference an expired FDA if it was also referenced in the CP application.

Existing and future FDAs should be conclusive on matters encompassed therein with respect to staff and ACRS reviews of further applications and should be utilized and relied upon by the staff and ACRS in their review of such applications. No feature of a standard design should be rereviewed by the staff and ACRS unless they determine, based on significant new information, that the design will not provide reasonable assurance of adequate protection of the public health and safety or the common defense and security.

C. Design Certifications

The Commission has indicated in its policy statement on severe accidents that it will issue DCs. DCs would be issued following the staff and ACRS review, and an appropriate proceeding, including the opportunity for a hearing. The DCs would be granted to entire plant designs or any major subsystems which represent discrete elements of the facility, and may be referenced in applications for a CP, an OL, or a COL. Applicants should be allowed to apply directly for a DC without first applying for a design approval, e.g., PDA or FDA.

DC applications will contain sufficient design information to enable the staff to reach a conclusion on matters encompassed therein that construction and operation of a facility utilizing the reference design will provide reasonable assurance of adequate protection of the health and safety of the public and the common defense and security. DCs should be conclusive on matters encompassed therein with regard to staff, ACRS, Commission and hearing board reviews of license applications, and must not be subject to challenge in individual licensing hearings. We believe that, ultimately, certified designs will become the most favored by the industry in view of their substantial stability. Moreover, this should lead to a process that allows approval, reference and multiple use of Design Certifications in COL proceedings.

DCs should be allowed to be referenced from their date of docketing and should be effective for periods of 10 years, renewable by the Commission for additional periods of no less than five years, nor longer than 10 years. These requests for renewal must be submitted no earlier than 36 months prior to the expiration date of the certification. The Commission is expected to grant these renewals unless it determines, based on significant new information, that the design will not comply with the Commission's regulations for the protection of the public health and safety or the common defense and security, applied in accordance with the Commission's backfit rule. Additional hearings should not be mandated for the Commission to grant a DC renewal, and DCs would remain in effect while awaiting Commission issuance of the renewals. The expiration of a DC should not affect the use of the reference design in applications that referenced the DC prior to its expiration. An OL application should be allowed to reference an expired DC if it was also referenced in the CP application.

STANDARDIZATION OPTIONS IN COMMISSION'S 1978 POLICY STATEMENT

While reference designs are developed and approved, we urge the Commission to retain for use in the near term the duplication, replication, and manufacturing license options. These options are described in the Commission's 1978 policy statement on standardization, and in NRC regulations, particularly Appendices M and N to 10 CFR Part 50. We believe that these options offer many of the benefits of standardization and are not in conflict with, and would not detract from, a successful standardization policy based upon the preapproval of reference designs. In particular, the duplicate and replicate plant concepts have been demonstrated to be effective means of reducing the staff and applicant resources required for licensing reviews.

We recommend that the Commission regulations relating to the duplication, replication, and manufacturing license options be revised and updated in a manner consistent with the preapproved reference designs. Accordingly, Preliminary and Final Duplicate Design Approvals (PDDA and FDDA) and manufacturing licenses should be effective for a period of 10 years from the date of issuance. Applications for replicate plants should be accepted for periods of 10 years from the date of issuance of the applicable SER supplement for the base plant. Manufacturing licenses should be renewable for additional periods of no less than five years, nor longer than 10 years.

In the review of license applications based on these options, the staff and the ACRS should utilize and rely upon the prior reviews and approvals of the designs to the maximum extent possible. The staff and ACRS reviews should focus only on those portions of the applications which differ from the previously approved designs.

DESIGN INFORMATION REQUIREMENTS FOR FINAL DESIGN APPROVAL AND DESIGN CERTIFICATION APPLICATIONS

We urge the Commission to indicate its intent to provide a high level of discipline to the licensing process by not allowing standard designs to be rereviewed unless the staff determines, based on significant new information, that the designs will not provide reasonable assurance of adequate protection of the public health and safety or of the common defense and security. However, we recognize that in order to ensure a meaningful review process that will allow the staff to reach the required health and safety determinations, it is necessary that the applications include all the information necessary to properly define and characterize the construction and operation of the designs.

For FDAs and DCs it is expected that essentially complete design information will be provided.

However, the term "essentially complete" needs to be defined.

FDA and DC applications should define the major design components and include the results of preliminary engineering to identify as appropriate:

- Design basis criteria
- Analysis and design methods
- Functional design and physical arrangement of auxiliary, BOP, and NSSS systems
- Plant physical arrangements sufficient to accommodate systems and components
- Functional/performance specifications for components and materials sufficiently detailed to become a part of associated procurement specifications
- Acceptance/Test Requirements
- Risk Assessment Methodology

Design documentation for systems, structures and components should include as appropriate:

- Design basis criteria
- Plant general arrangements of structures and components
- Process and instrumentation diagrams
- Control logic diagrams
- System functional descriptions
- Component and procurement specifications including acceptance test requirements
- Construction and installation specifications
- QA program
- Emergency plans
- Supporting design documentation such as site data and calculations sufficient to support the above level of design detail
- Security
- ALARA/Radiation Protection
- Accident Analysis
- Draft Technical Specifications
- Risk Analysis

In developing detailed guidance describing the information to be included in FDA and DC applications, the staff should stress that in the limited cases where design information is not available, information on methods, procedures and performance criteria, rather than the detailed description of specific pieces of equipment sometimes provided in OL applications, would be acceptable. This guidance should also be consistent with recent Commission emphasis on less prescriptive and more performance oriented regulations.

Applications for FDAs and DCs should define the tests, inspections, analyses, and acceptance criteria related thereto necessary to assure that the designs are properly installed in the plant. These tests, inspections, analyses, and acceptance criteria would be implemented in a series of sign-as-you-go reviews through construction and preoperation.

The degree of design detail necessary for providing an essentially complete design will generally be that detail which is suitable for obtaining specific equipment or construction bids. As detailed "name-plate" information becomes available during the procurement and construction process, refinement of the reference design may be desirable. To take such refinements into account, the holder of a license utilizing a reference design may submit, as applicable, a proposed program of NRC auditing of the refinements against the detailed approved design, utilizing the acceptance criteria which are part of the FDA or DC.

Industry organizations experienced in developing license applications are available to work with the NRC staff to develop and document detailed guidance describing the design information to be included in FDA and DC applications.

CHANGES TO STANDARD DESIGNS

We urge the Commission to reiterate its endorsement of regulatory actions that will strongly encourage and assist the industry in the pursuit of standardization in future reactor designs. In the past, regulatory practice has resulted in the rereview and backfit of designs in a manner that undermined the basic concepts of standardization. To ensure a more disciplined and predictable review and licensing process, the staff and ACRS should be directed not to rereview any feature of an approved standard design unless they determine, based on significant new information, that the design will not provide reasonable assurance of adequate protection of the public health and safety or of the common defense and security.

In applying the backfit rule to standard designs, the analyses required by the backfit rule should be performed on the first or lead unit for the given design. If the backfit can be justified on the lead unit, it should be implemented on all units referencing that design unless otherwise justified. If the backfit cannot be justified on the lead unit, it will not be applied to any unit referencing that design. Where a lead unit does not exist, the backfit analysis should assess the impact to total plant costs. Appendices M, N and O to 10 CFR Part 50 should be modified accordingly.

The requirements of the backfit rule are applicable after the date of issuance of the initial design approval under Appendix M, N or O to 10 CFR Part 50. For designs going through different levels of approval, e.g., a PDA followed by an FDA, the requirements of the backfit rule should be considered applicable after the issuance of the first approval in the same manner that in a non-standard plant the requirements of the backfit rule become applicable after the issuance of a CP.

The dates of applicability for the requirements of the backfit rule constitute a disincentive to the designers to develop a final design without first obtaining a PDA. Once a PDA is issued, the requirements of the backfit rule become applicable, and the designer may then proceed to finalize the design with the stability afforded by the backfit rule. On the other hand, if a designer proceeds directly towards the development of a final design, it will incur the associated expenditures without such stability until the FDA or DC is issued.

In order to encourage the development of final standard designs, we recommend that the provisions of the backfit rule be made applicable for FDA, FDDA, and DC applications not based on previously approved designs beginning six months prior to the date of docketing of the FDA, FDDA or DC applications, respectively. Such applications would include a complete list of the applicable requirements and guidance documents in effect six months prior to docketing. This list would be reviewed and acknowledged in writing by the staff as part of the predocketing review of the application, and would serve as the basis for the review of the design. This approach is consistent with current regulations (10 CFR Part 50.34(g)) that require that applications for a CP, manufacturing license, and PDA or FDA be evaluated against the Standard Review Plans in effect six months prior to the docketing date. This policy should be implemented in new regulations for DCs and in modifications of existing regulations.

DCs, issued following appropriate DC proceedings, must not be subject to challenge in individual licensing proceedings. Any challenge to a DC, whether sought by reason of special circumstances or otherwise, should only be considered in a DC amendment proceeding. The Commission should not modify any final determination of an issue that has been considered and decided in DC proceedings unless it determines, based on significant new information, that a modification is required to protect the public health and safety or the common defense and security, applied in accordance with the Commission's backfit rule. In response to a third party petition for a DC amendment proceeding, the Commission should not admit an issue that has been considered and decided in the DC proceeding or an earlier DC amendment proceeding unless the Commission determines that a *prima facie* showing has been made that there is significant new information indicating that a design modification is required to provide reasonable assurance of adequate protection of the public health and safety or the common defense and security.

The need to allow standard design holders and licensees to make changes in order to incorporate such considerations as new technical developments or improvements in the reliability or safety of the designs, or to make accommodations for maintenance, radiation protection or other procedural practices, should be recognized. For example, a licensee with other operating nuclear power plants may want to change the design of the control room in a standard design plant in order to maintain common features with the control rooms in its other plants. Similarly, the holder of a standard design approval may want to incorporate new technical advances that may improve the performance of the design, and thus increase its market appeal.

The Commission should approve an amendment to a design approval upon application by the holder of the design approval unless it determines that the amendment will not comply with the appropriate Commission regulations. Changes requested by the holders of standard design approvals or certifications would apply only to applications referencing the affected standard design and submitted after the changes have been approved. Requests for amendments to DCs would result in the appropriate proceedings.

Similarly, changes requiring approval and requested by CP, OL, and COL holders that referenced a standard design approval should be approved unless it is determined that they are not in compliance with the appropriate regulations. Such changes would be limited to the license(s) for which they were requested. Safety related changes to OLs and COLs may result in the opportunity for a hearing.

Changes other than unreviewed safety questions and changes in the technical specifications incorporated in the licenses do not require Commission approval in accordance with 10 CFR Part 50.59.

LICENSE FEES

To obtain the many safety and other benefits of the use of standardized designs, it is in the public interest further to encourage their development and utilization. A significant incentive for this is an appropriately structured Commission approach to the payment of filing and issuance fees. We believe that the concept embodied in Section 170.12(e) of 10 CFR Part 170 as it was constituted prior to its revision on May 21, 1984, reflects such an approach. Consistent therewith, we urge the Commission to provide for deferral of filing or issuance fees for applications, amendments or renewals for PDAs, FDAs and DCs until reference use of the approved design is made in a facility application and that payment in five (5) installments, as established in former Section 170.12(e), be reinstituted. Those FDA fees pending for which a DC application is docketed or formal notice of intent to docket is received within one year should also be so treated.

Atomic Industrial Forum, Inc.
7101 Wisconsin Avenue
Bethesda, MD 20814-4805
Telephone: (301) 654-9260
TWX 7108249602 ATOMIC FOR DC

Carl Walske
President

March 20, 1986

The Honorable Nunzio J. Palladino
Chairman
U.S. Nuclear Regulatory Commission
1717 H Street, N.W., Room 1114
Washington, DC 20555

Dear Chairman Palladino:

The Atomic Industrial Forum (AIF) has placed high priority on achieving a climate within industry and government conducive to building nuclear power plants to meet future electricity demand in the United States. For this to be possible we must all be assured that future plants can be built and operated cost-effectively, while sustaining appropriate levels of safety. We continue to support strongly Commission efforts to implement a standardization process within a stable regulatory framework, and your corresponding initiative to issue a new policy statement reiterating NRC support of standardization.

The enclosed "Position Paper on Standardization" identifies and addresses key ingredients that we believe are necessary to achieve a comprehensive and effective standardization policy. This position paper was developed by the AIF Study Group on the Practical Application of Standardized Nuclear Power Plants in the United States, with general support from EEI, EPRI, NUMARC and ANEC. We believe that it describes a comprehensive policy which would encourage and support the development of standard nuclear power plants in the United States. We urge the Commission to act on its recommendations.

We have an effort underway to explore new organizational arrangements for sharing financial risks and a study to quantify the cost savings from standardization. We intend to complete these in the next several months and will distribute the results broadly to industry and government decision-makers.

We would welcome an opportunity to meet with you and the staff to clarify further our views and answer any questions that you may have.

Sincerely,

Carl Walske

CW:spg
Enclosure
cc: Commissioner Asselstine
Commissioner Bernthal
Commissioner Roberts
Commissioner Zech
Mr. Victor Stello

AIF STUDY GROUP ON THE PRACTICAL APPLICATION OF STANDARDIZED NUCLEAR POWER PLANTS IN THE UNITED STATES

CHAIRMAN

John E. Ward
Vice President and Manager
Management Analysis Company

MEMBERS

Kent R. Brown
Group Vice President, Technical Services
Kansas Gas & Electric Company

Barton Z. Cowan
Partner
Eckert, Seamans, Cherin & Mellott

W. C. Drotleff
Vice President
Stone & Webster Engineering Corporation

Murray Edelman
Vice President, Nuclear Group
The Cleveland Electric Illuminating Company

Richard Fryling
Associate General Solicitor
Public Service Electric & Gas Company

J. Christopher Judd
Project Manager
Bechtel Power Corporation

Frank D. Judge
General Manager
General Electric Company

Paul McGill
Vice President
Combustion Engineering, Inc.

Michael Miller
Partner
Isham, Lincoln & Beale

James S. Moore
Vice President and General Manager
Westinghouse Electric Corporation

Louis E. Pardi
Division Manager
Daniel Power Company

Richard B. Priory
Vice President, Design Engineering
Duke Power Company

Charles W. Pryor
Vice President and General Manager
The Babcock & Wilcox Company

Cordell Reed
Vice President, Nuclear Operations
Commonwealth Edison Company

James Rhodes
Senior Vice President
Virginia Power Company

Gunnar E. Sarsten
President and Chief Executive Officer
United Engineers and Constructors, Inc.

Louis J. Sas
Vice President, Corporate and
Consulting Engineering
Ebasco Services, Inc.

C. Frederick Sears
Vice President of Nuclear and
Environmental Engineering
Northeast Utilities

Edwin E. Van Brunt, Jr.
Executive Vice President
Arizona Nuclear Power Project

Paul L. Wattelet
Partner and Project Director
Sargent & Lundy

Joseph W. Williams, Jr.
Group Vice President, Nuclear Energy
Florida Power & Light Company

(continued)

LIAISON REPRESENTATIVES

Loring E. Mills
Vice President, Nuclear Activities
Edison Electric Institute

Thomas J. Price
Vice President and Associate Counsel
American Nuclear Energy Council

John J. Taylor
Vice President
Nuclear Power
Electric Power Research Institute

STAFF SECRETARY

Robert A. Szalay
Senior Vice President
Atomic Industrial Forum, Inc.

The **Chairman**. Thank you, Mr. Priory.

Mr. Friend.

STATEMENT OF HOWARD B. FRIEND, VICE PRESIDENT, BECHTEL POWER CORP.

Mr. **Friend**. Thank you, Mr. Chairman. I am here today representing the Bechtel group of companies in providing testimony to the committee on the subject of nuclear powerplant licensing reform and standardization.

Bechtel provides engineering, procurement, construction and management services for major industrial facilties worldwide. Bechtel Power has had major design and construction responsibilities on over 40 percent of the nuclear powerplants operating in the United States today and over 30 percent of the completed nuclear powerplants overseas on which American firms have been involved.

Today nuclear power is not considered a viable option for the U.S. utility industry for a variety of reasons. No new domestic nuclear powerplants have been ordered since 1978. Those units ordered subsequent to 1974 were all canceled or deferred, along with about one-half of those on order at the end of 1974.

Many of the U.S. nuclear equipment suppliers have abandoned the market. The ranks of nuclear project experienced technical professionals and managers in engineering and construction organizations serving the utilities is thinning. United States technological leadership is being forfeited to the French, Germans, and Japanese.

All of this is not too surprising, since following the energy crunch of 1973 the U.S. electricity growth rate dropped from 7 percent a year to less than 3 percent, and about half of the new capacity on order, most of it nuclear, was not necessarily in any reasonable timeframe.

The Nation now, however, is approaching the point when major new generation must be planned and ordered. The North American Electric Reliability Council concluded last year that the present and planned electric growth capacity will accommodate an annual rate of growth of only 2.2 percent for the next 10 years. This assumed that scheduled completion of all the plants then under construction, both nuclear and fossil, as well as timely completion of those coal-fired plants which were planned but not yet placed on order.

It should be noted that this is a national average, and some regions of the country can accommodate even less growth. Thus, the question of what type of plant to order will likely arise in the relatively near future. We believe the utilities not only will want to continue to diversify their supply sources between coal and nuclear if possible, but also will find that nuclear power is economically competitive in many areas, providing that plants can be licensed and built in a predictable and orderly manner.

While there are a number of contributing factors, the major disincentive to the continued use of nuclear energy is the lack of predictability and stability in the Federal Government's nuclear licensing process which was established by the Atomic Energy Act of 1954 and is currently implemented by the Nuclear Regulatory Commission.

The primary solution to this uncertainty in the nuclear licensing process is contained in standardization and licensing reform legislation currently awaiting action by the Congress. These bills all have common provisions which would facilitate the elimination of the problems inherent in the present licensing process and allow electric utilities in this country to consider nuclear once again as a viable complement to coal for future baseload electric capacity needs.

Today I am here to testify in favor of S. 2073 and to urge its enactment into law. A key concept of S. 2073 is that of standard nuclear plant designs. The legislation directs the NRC to establish procedures, standards, and criteria for approving standardized plant designs.

Very simply, a standard design is a design of either a complete nuclear powerplant or a major portion that has been preapproved by the NRC and can be replicated from utility to utility while meeting all safety requirements.

Setting aside site-specific aspects of plant design such as cooling water intake, we estimate that 90 percent of a plant design can be standardized down to the level of component and equipment specifications. In fact, we believe we can even standardize for seismic requirements over a range of possible sites in the United States.

The major benefits of standardization are reduced proliferation of new designs, new training programs, new quality assurance in operating procedures and new reviews. All of these can contribute to greater safety, far shorten construction lead times, and lower cost.

We at Bechtel know our customers in the utility industry well and believe that before considering nuclear plant orders to meet electricity demands and requirements for the mid-1990's, the utilities need to be able to order plants with designs that are essentially complete, preapproved, and known for demonstrated excellent records of safety, economy, and reliability.

The latter point is especially important, I might add, because in utility pioneering, enough to order a new nuclear unit will undoubtedly avoid designs without a proven track record of superior performance.

What makes legislation like S. 2073 vital in driving standardization and bringing its benefits to utilities and their ratepayers is the promise of regulatory stability through a new licensing system. That forces every major issue to be resolved before a single shovel of dirt is turned.

I am speaking of S. 2073's provision for combined construction permit and operating license. S. 2073 allows utilities to apply for a construction permit and operating license that incorporates not only prelicense powerplant design but also specifies that the NRC develop a step-by-step construction, inspection, and approval process.

A COL must also contain the inspection test analyses and acceptance criteria that are necessary to provide reasonable assurance that the plant has been constructed and will operate in accordance with the license.

It is because standardization extends beyond just the physical structures defined in the plant design to also include procedure and programs in quality assurance, security, inspections, et cetera, that a COL is vital in forcing utilities and the NRC to resolve these issues before construction begins. Otherwise, a utility begins the process with preapproval available only for the concrete and steel part of the project, leaving the door open for ad hoc action on other safety issues to the point where standardization becomes meaningless as construction proceeds.

In short, Mr. Chairman, it is the COL that drives standardization by forcing every major issue of design and procedure to be resolved up front. Industrywise standardization as opposed to a single utility's replicating a single plant cannot happen without the COL, and the COL is impossible without legislation like S. 2073.

There are two questions that are often asked about standardization legislation. One relates to its potential for insulating nuclear power from technological advances, and the other to public participation in the licensing process.

Let me offer my views on both subjects. First, S. 2073 in no way freezes powerplant designs for the 10-year period in which they would be licensed by the NRC. The legislation provides for design amendment proceedings which after a showing of cost can lead to a hearing and the modification or amending of a design approval.

Of course, a design can only be licensed in the first place after a mandatory public hearing. This leads me to comment on the public participation aspects of S. 2073. Misnamed a one-step licensing bill because of its COL provision, S. 2073 actually provides for more public participation in nuclear power plant licensing decisions than is available today.

I already mentioned that the prelicensing of plant design requires a public hearing under S. 2073, but the legislation also provides for the approval of sites independent of whether or not the utility applies for a COL.

Finally, the NRC can grant preoperational hearing on the basis that a nuclear plant has not been constructed or will not operate in conformity with its license. Intervenors would have to present new information that was not or could not have been considered in a prior proceeding. A threshold certainly exists at this point, but we believe that it makes for fairness and order.

When the opportunities afforded for public involvement afforded by S. 2073 are tallied, Mr. Chairman, the difference to us is quite clear. The public wins in S. 2073.

In conclusion, the passage of a nuclear power plant licensing reform legislation is the single most important action that Congress could take to revitalize the nuclear option and insure a diversity of fuel supply options to meet this Nation's growing demand for electricity. Standardization is an integral part of the proposed reform and a goal which Bechtel as well as other members of the nuclear industry are prepared to achieve.

Thank you.

[The prepared statement of Mr. Friend follows:]

TESTIMONY TO THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

by

Howard B. Friend, Vice President
Bechtel Power Corporation
April 22, 1986
Washington, D.C.

NUCLEAR POWER PLANT LICENSING REFORM AND STANDARDIZATION

My name is Howard Friend. I am a Vice President of Bechtel Power Corporation, representing the Bechtel Group of companies in providing testimony to the Committee on the subject of nuclear power plant licensing reform and standardization. Currently, I am Manager of Project Operations in our San Francisco office and have been with Bechtel for nearly 34 years. I have served as Manager of Division Engineering for the San Francisco Power Division and have spent most of the past 25 years in responsible engineering or project management positions related to the design and construction of nuclear generating plants.

Bechtel provides engineering, procurement, construction and management services for major industrial facilities, worldwide. Bechtel Power has had major design and construction responsibility on over 40% of the nuclear power plants operating in the United States today and over 30% of the completed nuclear power plants overseas on which American firms have been involved. This experience spans the history of commercial reactors from the pioneer installations of EBR 1, Dresden 1, Humboldt Bay, Big Rock Point, and Peach Bottom 1 to Bechtel's current generic design project typified by the Standardized Nuclear Power Plant System (SNUPPS) plants and the three Palo Verde units. Including our ongoing nuclear services work Bechtel engineers today are providing technical assistance at 100 nuclear power plants around the world. Based upon this extensive experience, we believe we are well qualified to speak on the issue of nuclear power plant licensing reform and standardization.

There are only two domestic energy resources that can be relied upon to meet the long term, base load electricity demands of this country--coal and nuclear. Continuing use of both is essential because of environmental concerns as well as for the nation's economic well-being, energy self-sufficiency and our national security.

Unfortunately today nuclear power is not considered a viable option by the U.S. utility industry. For a variety of reasons, no new domestic nuclear power plants have been ordered since 1978. Those nuclear units ordered subsequently to 1974 were all cancelled or deferred, along with about half of those on order at the end of 1974. Many U.S. nuclear equipment suppliers have abandoned the market. The ranks of nuclear project-experienced technical professionals and managers in the engineering and construction organizations serving utilities are thinning. U.S. technological leadership is being forfeited to the French, Germans and the Japanese.

All of this is not surprising, since following the energy crunch of 1973 the U.S. electricity growth rate dropped from 7% per year to less than 3% and about half of the new capacity on order, most of it nuclear, was not necessary in any reasonable time frame.

The Nation now, however, is rapidly approaching the point when major new generation must be planned and ordered. The North American Electric Reliability Council concluded last year that the present and planned electric power capacity will accommodate an annual rate of growth of only 2.2% for the next 10 years. This assumed the scheduled completion of all of the plants then under construction both nuclear and fossil, as well as timely completion of those coal-fired power plants which were planned but not yet placed on order. It should be noted this was a national average and that some regions of the country can accommodate even less growth.

The average annual growth rate since 1982 has been substantially higher than 2.2%. While it is impossible to forecast the rate of growth of electric power demand precisely, it would seem prudent for utilities to plan on a rate of growth at least equal to that of the Gross National Product which is expected to grow by at least 3% over the next decade - some predict an even higher rate.

In order to assure completion of new capacity in the early to mid 1990s when it is likely to be needed in many areas (and assuming an orderly licensing and construction process), many utilities should be ordering new coal or nuclear capacity within the next couple of years.

Thus, the question of what type of plant to order will likely arise in the relatively near future. We believe the utilities not only will want to continue to diversify their supply sources between coal and nuclear, if possible, but also will find that nuclear power is economically competitive in many areas--providing the plants can be licensed and built in a predictable and orderly manner.

While there are a number of contributing factors, the major disincentive to the continued use of nuclear energy is the lack of predictability and stability in the Federal Government's nuclear licensing process, which was established by the Atomic Energy Act of 1954 and is currently implemented by the Nuclear Regulatory Commission.

The primary solution to this uncertainty in the nuclear licensing process is contained in standardization and licensing reform legislation, currently awaiting action by the Congress. These bills: S. 2073, S. 836, H.R. 2488, H.R. 1447, and H.R. 1029 all have common provisions, which would facilitate the elimination of the problems inherent in the present licensing process and allow electric utilities in this country to consider nuclear once again as a viable complement to coal for future base load electric capacity needs. Today, I am here to testify in favor of S. 2073 and to urge its enactment into law.

A key concept of S. 2073 is that of standard nuclear plant designs. The legislation directs the NRC to establish "procedures, standards and criteria" for approving standard power plant designs. Very simply, a "standard design" is a design of either a complete nuclear power plant or a major portion (e.g., nuclear steam supply system or balance-of-plant) that has been preapproved by the NRC and can be replicated from utility to utility while meeting all safety requirements. Even setting aside site-specific aspects of a plant design, such as cooling water intake and discharge, we estimate that 90 percent of a plant design can be standardized down to the level of component and equipment specifications. In fact, we can even standardize for seismic requirements over a range of possible sites in the United States.

The major benefits of standardization are reduced proliferation of new designs, new training programs, new quality assurance and operating procedures and new reviews. All of these can contribute to greater safety, far-shortened construction lead times and lower costs. We at Bechtel know our customers in the utility industry well and believe that before considering nuclear plant orders to meet electricity demand requirements in the mid 1990s, utilities need to be able to order plants with designs that are essentially complete, preapproved and known for demonstrated records in safety, economy and reliability. The latter point is especially important, I might add, because any utility "pioneering" enough to order a new nuclear unit will undoubtedly avoid designs without a proven track record of performance.

What makes legislation like S. 2073 vital in driving standardization and bringing its benefits to utilities and their ratepayers, is the promise of regulatory stability through a new licensing system that forces every major issue to be resolved before a single shovel of dirt is turned. I am speaking of S. 2073's provision for a combined construction permit and operating license - a "COL."

S. 2073 allows utilities to apply for a COL that incorporates not only a prelicensed power plant design, but also specifies the step-by-step construction inspection and approval process the NRC is required to develop under the legislation. A COL must also contain the "inspections, tests, analyses, and acceptance criteria ... that are necessary to provide reasonable assurance that the plant has been constructed and will operate in accordance with the license."

It is because standardization extends beyond just the physical structures defined in a plant design to also include procedures and programs in quality assurance, security, inspections, etc., that a COL is vital in forcing utilities and the NRC to resolve these issues before construction begins. Otherwise, a utility begins the process with preapproval available only for the concrete and steel part of a project, leaving the door open for ad hoc action on other safety issues to the point where standardization becomes meaningless as construction proceeds.

In short, Mr. Chairman, it is the COL that drives standardization by forcing every major issue of design and procedure to be resolved up-front. Industry-wide standardization, as opposed to a single utility's replicating a single plant, cannot happen without the COL, and the COL is impossible without legislation like S. 2073.

There are two questions I am often asked about standardization legislation generally. One relates to its potential for insulating nuclear power from technological advances, and the other to public participation in the licensing process. Let me offer my view on both subjects.

First, S. 2073 in no way "freezes" power plant designs for the 10 period in which they would be licensed by the NRC. The legislation provides for "design amendment proceedings" which, after a showing of cause, can lead to hearing and the modification or amending of a design approval. Of course, a design can only be licensed in the first place after a mandatory public hearing.

This leads me to comment on the public participation aspects of S. 2073. Misnamed a "one-step" licensing bill because of its COL provision, S. 2073 actually provides for more public participation in nuclear power plant licensing decisions than is available today. I already mentioned that the prelicensing of a plant design requires a public hearing under S. 2073. But the legislation also provides for the approval of sites independent of whether or not a utility has sought to construct a plant; such site preapprovals also require public hearings under S. 2073. Yet another public hearing is required when a utility applies for a COL. Finally, the NRC can grant a preoperational hearing on the basis that a nuclear plant "has not been constructed or will not operate in conformity with the license." Intervenors would have to present new information "that was not and could not have been considered in a prior proceeding." A threshold certainly exists at this point, but we certainly believe that it makes for fairness and order. When the opportunities for public involvement afforded by S. 2073 are counted up, Mr. Chairman, the difference to us is quite clear: the public wins in S. 2073.

In conclusion, passage of nuclear power plant licensing reform legislation is the single most important action that Congress could take to revitalize the nuclear option and ensure a diversity of fuel supply options to meet this nation's growing demand for electricity. Standardization is an integral part of the proposed reform and a goal which Bechtel as well as other members of the nuclear industry are prepared to achieve.

The CHAIRMAN. Thank you, gentlemen, very much.

Mr. Turley has indicated the need for legislation. Mr. Friend, you have indicated that you favor it because it drives standardization. Are there other reasons that you could add, Mr. Friend, or any comments from you, Mr. Priory, as to why, if indeed, standardization can be achieved by regulation, why legislation is necessary or desirable?

Mr. PRIORY. I will comment on that for just a moment. I think, given the history that the utility has been through, and I have gone through a great deal of it, the consequence is that we went through a very stable and unpredictable manner, as you have heard this morning. Most of that was done by administrative rule in the regulatory process.

We recognize that the Commission may have within their group the capability to implement many of these provisions. I guess the problem is our perception as to whether that would result in a stable, long-term, predictable regulatory process for our plants.

Now, since you are asking us or would be asking us to really bet our companies that that would come through, we would much prefer to see a statutory basis for those changes.

The CHAIRMAN. That is what I understood Mr. Turley to say. Do you agree, Mr. Friend?

Mr. FRIEND. I agree with Messrs. Turley and Priory on that.

The CHAIRMAN. Mr. Turley, you made reference to Palo Verde units and you described the advantages that you've seen there replicating the same design and building the same kind of plant in several different units.

Would this design be able to enjoy the same advantages if it were built at another utility site?

Mr. TURLEY. If it were possible through the regulatory process to accomplish that, Mr. Chairman, the answer is yes. I think our experience with Palo Verde units 1, 2, and 3 illustrates the wisdom of standardization even though it was not a completely engineered plant when we launched it. We have heard a lot about investments and costs and predictability and stability, and those are important facts.

We have, however, reduced it all down to the customer level. I think that is the important thing, what we can do to control the cost of electricity to our customers. It is through this kind of legislation that it can be accomplished. Unit 3 construction costs, will be 70 percent of unit 1's construction costs.

So we get the knowledge, the experience, the skill and the replication benefits, and I think that illustrates more than anything else why it is so important.

The CHAIRMAN. Mr. Turley, how much of a plant can be standardized?

Mr. TURLEY. As a purchaser, I would hope 100 percent.

The CHAIRMAN. That is a hope.

Mr. TURLEY. As a realist, you ought to be able to standardize 100 percent of the steam supply system in my judgment, but in our case the steam supply system represents only about $300 million of a $5 billion plant. So we ought to get the steam supply system 100 percent standardized and engineered. We ought to be able to answer every question in the safety arena 100 percent, and perhaps then if we could get 90 percent of the balance of the plants standardized, then the other 10 percent would be site specific. I think we would have something that would really bring this industry back.

The CHAIRMAN. Do you think that is achievable?

Mr. TURLEY. I think it is, based upon our experience.

The CHAIRMAN. Mr. Priory.

Mr. PRIORY. I agree with that assessment. I think it is entirely possible.

The CHAIRMAN. Various questions have been raised by others with respect to the standardization of subsystems. If subsystems are standardized, how well do they fit together? Do you, because you fit them together, raise questions that cannot be simply standardized?

Mr. FRIEND. I think that any attempt with standardization should not and cannot be done in a vacuum; that is, the standardized subsystems must be designed and coordinated with the standardized nuclear steam supply system. All of those component systems or parts thereof that are central to the safety of the plant certainly can and should be standardized to allow the NRC to grant approval in advance of the design.

I think that subsystems of components also are quite readily amenable to standardization, but they must be coordinated with the important safety features of the plant.

The CHAIRMAN. The concern that has been expressed by some, and I think Chairman Palladino made reference to it earlier today, you may standardize the subsystem and the subsystem and the subsystem, and then you hook them together and you raise questions.

Do you think that is a valid concern, or can those questions be either eliminated or minimized by standardization and preliminary approvals?

Mr. FRIEND. Certainly in my view they can be minimized and probably eliminated.

The CHAIRMAN. Mr. Priory.

Mr. PRIORY. Mr. Chairman, I referred to a substantial up-front investment on behalf of the utilities, the architect engineers and the NSSS suppliers or whoever may participate in this first plant. That investment in itself I think would preclude the proliferation of a great number of subsystems and the attempts to try to interface those many subsystems. If we are down to talking to a handful of design certifications, which is where I believe we will be, then the problem of interfacing subsystems is one that we have dealt with over the years many times.

Mr. TURLEY. Mr. Chairman, I would just observe if we do not achieve standardization of subsystems we are not going to achieve our objective, and I think it can be done. I think it must be done.

The CHAIRMAN. So that they can be interconnected with predictability?

Mr. TURLEY. Yes, sir.

The CHAIRMAN. One of the things that lies behind much of the testimony, I believe, is the allocation of the burden between vendors and utilities. When it started out, the vendors had most of the responsibility. Today that burden has shifted almost entirely to utilities. The pending legislation would reallocate, in effect, some of that responsibility. Is that an appropriate comment?

Second, does the bill allocate responsibility predictably and appropriately?

Mr. TURLEY. Mr. Chairman, I think the bill does force upon the vendors the responsibility for doing the appropriate design work and safety analysis work so that they will have a product market, and they are going to have to make that investment just like any other manufacturer of any other product has to carry out the research and development cost. That, then, would be a function of the vendors, it seems to me.

I hasten to add you cannot and you should not remove from the utility the responsibility for the safe operation of that powerplant. That should be the utility's responsibility and no one else's.

The CHAIRMAN. Mr. Priory, I believe that the provisions of the bill will tend to reallocate the responsibilities in a more desirable way than we presently have. A description of the utility taking the entire responsibility is, I believe, right on the money under the current process, and that has to change. There has to be more risk taking and involvement by the parties. I believe the provisions of this bill will do just that.

Mr. Friend, any comment.

Mr. FRIEND. I agree with the two previous speakers.

The CHAIRMAN. Mr. Turley, you and many other people have made reference to the successes of a three-unit Palo Verde nuclear generating station, and the NRC has noted that they call that the plant of the future.

Yet, there are some problems that are not solved or at least have been raised with respect to even that approach. During the operating license review for Palo Verde, intervenors apparently questioned whether there was enough affluent to supply both Palo Verde and area farmers.

Intervenors were also concerned with the amount of salt that might have been released with steam from your cooling towers. Were these issues raised before construction began?

Mr. TURLEY. Mr. Chairman, that is a good example of the problems created with our present system. We dealt with the adequacy of the affluent from the city of Phoenix. We dealt with the impact of whether or not there would be any salt affecting crops at the time of the construction permit. We did it through the environmental report which is a part of that hearing.

There were no intervenors. No questions were raised. Ultimately, however, at the time we went for our operating permit we had people come forward questioning the adequacy of the water supply and questioning whether or not crops would be harmed, and so we addressed it.

We went through very, very expensive multimillion dollar studies and analyses, with the conclusion that our original construction permit studies were valid. That issue has been put to rest.

The CHAIRMAN. If I understand you correctly, you raised those issues? No one else did? They had the opportunity to at the earlier stage, did they not?

Mr. TURLEY. That is correct.

The CHAIRMAN. Would a combined operating license have forced a resolution of these issues early in the process and precluded the intervention later?

Mr. TURLEY. I think it would have, Mr. Chairman. We have to have the hearings. When you go to site specific, all of those issues could and should be raised at the very earliest moment, and that would be the appropriate time so that we would not have to encounter it later on in the history of the construction project.

The CHAIRMAN. Have you had to back fit either of the two operating units since they came on line?

Mr. TURLEY. Mr. Chairman, we have had a good deal of reevaluation and reanalysis. Rule changes have required that over the years. Fire protection, security and equipment qualification have all impacted the units as we have gone through construction.

As a result of the requirement studies by NRC, when we determine to make a fix on unit 3, then we have to do it to unit 2 and we do it to unit 1. We do a good deal of that. A standardized design and a combined construction operating license, in my judgment, would avoid all of that. All of those issues would be laid to rest very, very early in the process.

The CHAIRMAN. Could these design changes and retrofits have been anticipated and decided on before you began construction?

Mr. TURLEY. I believe so. One, we would have had 80, 90, or 100 percent of the engineering and design work done before we went into construction, whereas under our current program we started out with maybe 20 percent at the time. We sought our construction permit, and when it was awarded we had about 40 percent of the design work done.

So it is clear to me that where it is all done as a part of the standardization process, the answer is yes.

The CHAIRMAN. You have indicated that a shortening of the leadtime is desirable for a variety of reasons, but one that you identify is that State regulators might be more supportive of future additions to your baseload capacity if the leadtime could be shortened. What do you say to that?

Mr. TURLEY. I think regulators, Mr. Chairman, are just as interested in stability and predictability as the industry is. I might as, as I am very, very pleased to see, that you, sir, as well as NRC and the Department of Energy, are interested in those same things.

What it means to them is that they can approach the ratemaking process with some confidence in what will happen to future rates. A shortened construction period dramatically reduces the investment in a project. Palo Verde is a very, very good example. Our cost per kilowatt will be about $1,550. That is the construction cost.

When you include the interest cost, the financing cost, and the property taxes paid during construction, you add another $800 to that investment on which now we must earn for the next 30 years, and that has an enormous impact on rates.

So to the degree we can reduce that construction period, the financing cost along would be less, to say nothing about the ability to outwit, as it were, galloping in flation to the degree you have the shorter construction period.

The CHAIRMAN. Mr. Priory, is Duke Power going to have to add baseload capacity to its system in the next 10 years?

Mr. PRIORY. Yes, we forecast we will have to in the mid-1990's.

The CHAIRMAN. You have in your company an extraordinary record of success in designing, building and operating nuclear powerplants. Do you have in your immediate future to meet that 10-year goal any plans for further nuclear powerplant construction?

Mr. PRIORY. No, we do not. We have conducted our future system plan, and nuclear was considered along with the other available options that we have. At this point in time nuclear has not won out. The other options are more desirable to us at this point.

The CHAIRMAN. If S. 2073 or something similar to that were passed, would that change your evaluation?

Mr. PRIORY. It would certainly add a complete new flavor to it, and we would certainly re-do the evaluation. I do not know what the answer would be, but we believe that this would move nuclear far closer to being a competitive alternative to those which we currently have in our bailiwick.

The CHAIRMAN. I do not mean to put words in your mouth, but would it be fair to infer from that that the uncertainty and delay have made nuclear the less attractive option for a variety of reasons, not the least of which is the cost to which Mr. Turley has made refernence?

Mr. PRIORY. Mr. Chairman, that is a very fair assessment. We see it as a very risky investment in view of the uncertainty, and we have included that in our future forecast. As a result of that, nuclear is no longer an option for us.

The CHAIRMAN. I have a number of other questions to submit for the record, and I suspect other members of the committee have as well. I will not, however, take the time to do that today.

I wish to state to you my appreciation for your willingness to appear and testify today. Thank you very much.

Mr. PRIORY. Thank you, Mr. Chairman.

Mr. TURLEY. Thank you, Mr. Chairman.

Mr. FRIEND. Thank you, Mr. Chairman.

The CHAIRMAN. I think maybe we can hear the next panel before lunch. It would perhaps be necessary, and I would announce at this time, that there might be a brief break between panelist No. 2 and 3. If there is any problem that imposes on the members of panel three, we need to know. If not, we will try to do it in that fashion.

Now, panel No. 2, Mr. Sherwood Smith, Dr. Shelby Brewer, Dr. Daniel Wilkins, and Mr. James S. Moore. Gentlemen, your prepared statements will be placed in the record, you are invited to summarize or highlight that statement in whatever way you see fit.

Mr. Smith, you may proceed.

STATEMENT OF SHERWOOD H. SMITH, JR., CHAIRMAN, PRESIDENT AND CHIEF EXECUTIVE OFFICER, CAROLINA POWER AND LIGHT CO.

Mr. SMITH. Thank you very much, Senator McClure. I am Sherwood H. Smith, Jr., chairman and president of Carolina Power and Light Co. Also, currently I am chairman of the Edison Electric Institute as well as being a member of the board of directors of the Atomic Industrial Forum and the American Energy Nuclear Council. This statement is provided on behalf of all of these organizations, and I will summarize, since the full statement is to be included in the record.

At the outset, Mr. Chairman, I have to state that your own personal effort in leadership on all energy issues is very much appreciated, including in particular your understanding of the important contribution of electricity along with your recognition of nuclear energy as a major resource now and an essential resource for our future.

Your introduction of this legislation and the holding of this hearing are applauded as being very significant steps to achieve stability and predictability in the nuclear licensing process. Last year on July 25 this committee began receiving statements and testimony from a number of persons, all pointing toward the need for action to assure that electricity will be available to fulfill the Nation's needs over a long period of time.

As I stated then, being one of approximately 30 witnesses, our country is on a collision course between growing demand and our ability to meet that demand. The only change in this regard over the past year is that we are now one year further along this collision path. Unfortunately, one important energy source has essentially been removed from our available options; that is nuclear energy.

Our assessment today has not changed from a year ago when the report of the Edison Electric Institute on nuclear power was published with this statement, and I quote:

> Under present regulatory and institutional arrangements, no American electric utility would consider ordering a new nuclear power plant.

A similar statement was in the 1984 report of the Atomic Industrial Forum entitled "Nuclear Power in America's Future," and I quote again:

> Nuclear power cannot at this time be considered a viable option on which to base new electric generating capacity in the United States. If nuclear power is to compete for new electric generation, ways must be found to reduce the uncertainties and financial risk associated with capital intensive and long leadtime construction.

These two negative conclusions are unfortunately imposed on an energy form of vast potential that could well serve our country's electricity needs for many, many centuries, as is the case now in other countries.

Even though the technology to peacefully use nuclear energy was invented and developed in the United States, the option is being withdrawn from our future for regulatory and institutional reasons, not for technical reasons. We commend both President Reagan and Secretary of Energy Herrington for their specific support of nuclear energy and their recognition of the need for an approved approach to licensing.

The National Energy Policy Plan is the national statement on energy, and it includes important guidelines for nuclear energy. This plan recognizes the present licensing approach as a handicap to the use of nuclear energy and designates as on element of the strategy of this administration the following, and I quote:

> To reform the process of plant licensing and regulation legislatively, encouraging standardized plant design and one-stop licensing that insures safety and environmental protection with a minimum of litigious complication.

Our desires and efforts are in complete agreement with this element of the administration strategy. We urge Congress to join the administration on this item, and we in turn will work with both to succeed in this area where we have fallen short in prior attempts.

We have taken further steps to improve these plants' safety operations. Our setting a benchmark of excellence through the efforts of the Institute of Nuclear Power Operations and the establishment of the National Academy for Nuclear Training are specific industry actions of significant value. We will continue to seek further improvements.

Still, we are faced with a major obstacle on the Federal front. The licensing and regulatory process is unpredictable, lacking in stability and enormously expensive to the American consumer. Congress has the authority to rectify, to a large extent, this unsatisfactory situation.

The passage of S. 2073, the Nuclear Facility Standardization Act of 1986, will provide the direction needed to the Nuclear Regulatory Commission for the removal of many uncertainties in the present approach. Standard plant designs are essential to permit utilities to consider future nuclear powerplant commitments.

These designs must be preapproved by the NRC. Assurance must be given that when a plant is ordered, the regulatory process will be permitted to be built, and permission to operate the plant will not be withheld once all preapproved conditions are satisfied.

Congressional direction is essential for the concept of preapproved standard designs to be realized in conjunction with the issuing of a single-step license to construct and operate a nuclear powerplant.

Another significant factor is that several associations representing large consumers of electricity strongly support nuclear licensing reform legislation. These include the U.S. Chamber of Commerce, the National Association of Manufacturers, and the Electricity Consumers Resource Council. They, as consumers, realize that the revitalization of the nuclear energy option increases their chances of obtaining reliable and economical electricity over the long term.

Additionally, action on this bill is supported by the Building and Trades Department of the AFL-CIO, the American Public Power Association, and the National Rural Electric Cooperative Association.

Also, if I may I bring to your attention the lead sentence of the editorial entitled "Nuclear's Charm," appearing in the Economist of March 29, 1986, that reads as follows: "Only by investing heavily in nuclear power today can the world be sure of avoiding high cost energy in the 1990's and beyond."

Mr. Chairman, last month a major milestone was reached in licensing of the 100th nuclear powerplant, and earlier this month another nuclear powerplant was permitted to start low power operations. We have, however, lost the ability to make future commitments for the continued use of nuclear power. We submit it is in the public interest that this must be changed.

We are here today to urge that important step be taken of reporting out S. 2073 and to urge its passage by the full Senate. Please, we ask for your action now before we have lost the future value of this technology. Thank you for the opportunity to present the views of the nuclear industry. I must emphasize that the total nuclear industry supports this action.

I will be pleased to answer any questions.

[The prepared statement of Mr. Smith follows:]

Statement of Sherwood H. Smith, Jr.
Chairman, President and Chief Executive Officer of
Carolina Power and Light Company

on

S. 2073 - Nuclear Facility Standardization Act of 1986

Before the
United States Senate
Committee on Energy and Natural Resources

April 22, 1986

Mr. Chairman and Committee members, I am Sherwood H. Smith, Jr., Chairman and President of Carolina Power and Light Company. Also, I am Chairman of the Edison Electric Institute and a member of the Board of Directors of the Atomic Industrial Forum and the American Nuclear Energy Council. This statement is provided on behalf of all of these organizations.

Mr. Chairman, your personal effort on all energy related issues is very much appreciated, including your understanding of the important contribution of electricity, along with your recognition of nuclear energy as a major resource now and an essential fuel of the future. Your introduction of legislation and the holding of this hearing are applauded by all, as significant steps to achieve stability and predictability in the nuclear licensing process.

On July 25 of last year, I had the privilege of presenting a statement to this Committee on the electricity supply adequacy in the years ahead. During that comprehensive hearing, your Committee received statements from electric utility executives, several economists and many others, all pointing to the need for action to assure that electricity will be available to fulfill the nation's needs over the long term. As I stated then, we are on a collision course between growing demand and our ability to meet that demand. The only change in this regard over the past year is that we are one year further along the collision path.

Unfortunately, one important energy source has essentially been removed from our lexicon of options; that of nuclear energy. Our assessment today has not changed from a year ago, when the Report of the Edison Electric Institute On Nuclear Power was published with the statement:

> "....under present regulatory and institutional arrangements, no American electric utility would consider ordering a new nuclear power plant."

A similar statement was in the 1984 Report of the Atomic Industrial Forum entitled Nuclear Power In America's Future:

> "Nuclear Power cannot at this time be considered a viable option on which to base new electric generating capacity in the U.S. If nuclear power is to compete for new electric generation, ways must be found to reduce the uncertainties and financial risks associated with capital-intensive and long lead-time construction."

These unfortunate indictments are thrust upon an energy form of vast potential that could serve the world's electricity needs for many centuries. Even though the technology to peacefully use the capability of atoms to fission, and release large amounts of energy, was invented in the United States and is now being used here, the option has been withdrawn from our future, for regulatory and institutional reasons. France, Japan, and West Germany, are industrial nations that continue to effectively call on nuclear energy, and they will secure an international competitive advantage by using this technology as the backbone of their electricity requirements.

We commend President Reagan and Secretary Herrington for their specific support for nuclear energy and their recognition of the need for an improved approach to licensing. The National Energy Policy Plan, prepared under the direction of Secretary Herrington, and recently transmitted to the Congress by President Reagan, is the national statement on energy and it includes important guidance for nuclear energy. The Plan includes the following statement:

> "...it makes the most sense at this time for the energy sector of the U.S. economy to emphasize coal, nuclear energy, and conservation wherever they are economical. Electricity, though not a source of primary energy itself, has been an important delivery mechanism through which to apply this 'triad'. It will continue to be so."

We concur fully with this quote and the stated "triad". Coal is the primary fuel used to produce electricity, and it serves over fifty percent of the nation's demand. Nuclear energy has recently achieved the status of the second largest fuel source for electricity production, and it will grow to over twenty percent of the total demand as those plants still under construction are completed and brought on line. Conservation is pursued with vigor by our industry, wherever economically attractive. Conservation, in the form of more efficient use of electricity, is preferred rather than committing to additional production capacity.

This National Energy Policy Plan covers, in considerable detail, many actions that must be pursued to retain the health of the nation's energy supply. It recognizes the present licensing approach as a handicap to the use of nuclear energy and designates as one element of the strategy of the Administration:

> "To reform the process of plant licensing and regulation legislatively--encouraging standardized plant design and 'one stop' licensing that ensures safety and environmental protection with a minimum of litigious complication."

Our desires and efforts are in complete agreement with this element of the Administration's strategy. We urge Congress to join the Administration on this item, and we in turn will work with both of you to succeed in this area where we have fallen short with prior attempts.

How could we, the largest of industrial nations, lose this nuclear energy option while others are able to capitalize on its advantages? While the answer is complex, including electric utility industry inattention to some important details during our early application of the technology, several specific actions must be taken to regain the advantages offered with nuclear energy. We, the utility industry, have taken important steps to further the safety of plant operations. Our setting of "benchmarks of excellence" through the efforts of the Institute of Nuclear Power Operations, and the establishment of the National Academy for Nuclear Training are specific industry actions of significant value. We will continue to seek further improvements.

Still, we are faced with a major obstacle on the Federal front. The licensing and regulatory process is unpredictable and lacking in stability. Congress has the authority to rectify, to a large extent, this unsatisfactory situation. Passage of S. 2073, the "Nuclear Facility Standardization Act of 1986", will provide the direction needed to the Nuclear Regulatory Commission for the removal of the many uncertainties in the present approach. We will gladly work with your staff to finalize the wording of the legislation to achieve the purposes of the Act and maintain full protection of the public health and safety.

Standard plant designs are essential to permit utilities to consider future nuclear power plant commitments. These designs must be pre-approved by the NRC. Assurance must be given that, when a plant is ordered, the regulatory process will permit it to be built, and permission to operate the plant will not be withheld once all pre-approved conditions are satisfied. Congressional direction is essential for the concept of pre-approved standard designs to be realized in conjunction with the issuing of a single-step license to construct and operate a nuclear powerplant.

A recently completed Position Paper on Standardization, prepared by the AIF Study Group on the Practical Application of Standardized Nuclear Power Plants in the United States, goes a long way in defining what is meant by nuclear plant standardization and how the concept would be implemented. This Position Paper describes policies and actions that, if implemented by the Nuclear Regulatory Commission, are expected to encourage and support the development of standard nuclear power plants in the United States. Congressional passage of S. 2073 is needed to cause these actions to occur.

Another significant factor is that several associations, representing large consumers of electricity, strongly support nuclear licensing reform legislation. These include the United States Chamber of Commerce, the National Association of Manufacturers, and the Electricity Consumers Resource Council. They, as consumers, realize that the revitalization of the nuclear energy option increases their chances of obtaining reliable and economical electricity over the long term. Additionally, action on this is supported by the Building and Trades Department of the AFL-CIO, the American Public Power Association and the National Rural Electric Cooperative Association. Also, I bring to your attention the lead sentence of the editorial Nuclear's Charm, in The Economist of March 29, 1986, as follows:

> "Only by investing heavily in nuclear power today can the world be sure of avoiding high-cost energy in the 1990s and beyond."

Mr. Chairman, last month a major milestone was reached with the licensing of the 100th nuclear powerplant, and earlier this month another nuclear plant was permitted to start low power operations. Ninety-two of these nuclear energy powerplants have achieved commercial operation, and more electricity was produced by them during 1985 than from all fuel forms combined in 1950. We are committed to operate these plants safely and efficiently.

Major strides have been made in bringing this technology to an advanced state. However, we have lost the ability to make future commitments for its use. This must be changed. And we are here today to urge you to take the important step of reporting out, S. 2073 the "Nuclear Facility Standardization Act of 1986", and to urge its passage by the full Senate of the United States. Please, we ask for your action now, before we have lost the future value of this technology.

Thank you for this opportunity to present the views of the nuclear industry, and I must emphasize that the total nuclear industry supports this action. I will be pleased to answer your questions.

****

The CHAIRMAN. Thank you very much.

Dr. Brewer, we are glad to have you back before us in a different incarnation.

STATEMENT OF DR. SHELBY T. BREWER, SENIOR VICE PRESIDENT, COMBUSTION ENGINEERING, INC.

Dr. BREWER. Thank you very much, Mr. Chairman. I am pleased to be here.

You may recall, Mr. Chairman, the Presidential statement in 1981 on nuclear power. President Reagan issued a statement in October 1981. At the top of that list was a policy priority to reform the nuclear licensing process and other impedimenta to nuclear power.

A lot has been accomplished on that agenda laid down in 1981. For example, the Waste Management bill was passed after 2 arduous years of debate, and your leadership was vital in that as was that of this committee.

I believe, Mr. Chairman, that we are in a similar circumstance with the Licensing Reform bill submitted in the spring of 1983. It has enjoyed considerable attention by committees of both chambers in hearings. It has not, however, proceeded to markup. The relevant issues have been identified and addressed in some detail, and I think while we are not at the end and are not at the beginning, we are probably at the end of the beginning.

The CHAIRMAN. The end of the beginning, but not the beginning of the end. [Laughter.]

Dr. BREWER. Not the beginning of the end. I think maybe, perhaps, by the end of this session you will pull another "Senator McClure heroic act on the floor," as you did with the Waste bill.

The CHAIRMAN. I am not sure I have the strength to do it again. [Laughter.]

Dr. BREWER. Licensing reform is absolutely necessary for the preservation of a vital energy option in this country. Absent reform legislation, I do not expect to see another domestic nuclear station ever ordered in the United States.

As you know, the existing regulatory process was established 30 years ago at a time when the technology was developmental and the ad hoc custom design, custom regulation mode of pursuing this technology was appropriate. It is not suitable for the nuclear industry as it exists in its near maturity today.

Industry and the financial community must have the confidence that nuclear plants once committed to will be allowed to go into operation on a predictable schedule. Stabilization of the licensing process is absolutely a prerequisite to survival of civilian nuclear power in this country. We must standardize not only the product, but the process.

There is a population notion, Mr. Chairman, that licensing reform legislation would short-circuit and short cut safety review and public participation. Nothing could be farther from the truth.

In fact, Mr. Chairman, the reform legislation will sustain and enhance the nuclear industry's excellent safety record in this technology: first, by focusing the Nation's technical resources on fewer standardized plants or systems as opposed to squandering our technical resources on a plethora of custom designs and custom regulation; second, by more effective public participation early in the process before major financial resources are committed and public participation with essentially complete designs and setting proposal in hand before major financial commitments; and third, by a more systematic review of retrofit proposals to assure that the net overall plant safety is enhanced, not degraded, by such retrofit proposals.

Mr. Chairman, some have asked why licensing reform now? There is a scarcity, and the caseload in NRC is way, way down. There are no new orders in sight domestically. Why do it now? Why is it necessary to do it now?

I believe that this is the ideal time to enact licensing reform legislation because we do have a window of opportunity to get it right without the pressure of a high intensive NRC caseload.

So I strongly urge, Mr. Chairman, that Congress get on with passage of S. 2073. Thank you very much, sir.

[The prepared statement of Dr. Brewer follows:]

STATEMENT OF SHELBY T. BREWER

SENIOR VICE PRESIDENT
COMBUSTION ENGINEERING, INC.

TO THE
COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
APRIL 22, 1986

Thank you, Mr. Chairman, for the opportunity to provide testimony to this Committee as it considers legislation on nuclear licensing and regulatory reform.

I am Shelby T. Brewer, Senior Vice President, Combustion Engineering, Inc. Combustion Engineering is a major supplier of electrical generating systems -- both fossil-fired and nuclear -- oil and gas refinery systems, other major chemical processing systems, and industrial process control systems. We serve markets here in the U.S. and around the world. I am Chairman of the Board and a Director of American Pole, and a Director of Electro-Mechanics, C-E/Delas-Weir and Power Systems Energy Services, Inc.

My principal responsibility is the management of the Nuclear Power Systems Division of Combustion Engineering. Combustion Engineering designs and manufactures complete nuclear reactor systems, including nuclear fuel. We have manufactured most of the major nuclear components that are currently in use in the United States - including components used by our competitors. We also provide continuing engineering services to owners of our plants as well as to the owners of equipment supplied by our competitors.

Before joining Combustion Engineering, I served in the Reagan Administration as Assistant Secretary of Energy (for Nuclear Energy). It was my privilege to represent before congress the Administration's proposal for nuclear licensing reform legislation in 1983 and 1984.

I would like to take this opportunity to present my views on the need for licensing reform legislation and the various proposed bills before Congress. At the end of my presentation, I will provide an extended discussion on how standardization can be implemented by the NRC and the nuclear industry, based upon Combustion Engineering's experience designing and building its own standard design.

THE NUCLEAR RECESSION

As you know, Mr. Chairman, civilian nuclear power was developed and demonstrated in the 1950s and early 1960s, following President Eisenhower's initiatives in 1953-54. The technology was deployed rapidly and aggressively in the late 1960s and early 1970s. Since the mid-1970s, however, commercial nuclear power has been in a "recession". Over one hundred plants have been cancelled or deferred and the order rate for new capacity has dropped from over twenty units per year to zero.

To place the need for licensing and regulatory reform in context, I believe that it is important to enumerate the complex and inter-related factors which have led to this "nuclear recession":

- A downturn in the growth of electrical demand in the 1970s, which left utilities with excess capacity under construction.
- A prolonged period of high inflation and high interest rates during the 1970's which, together with extended licensing and construction schedules, resulted in quantum escalation of nuclear plant capital costs.
- Utility difficulties in forming capital for new or ongoing construction programs, resulting from unfavorable rate constraints and the retrenchment of the financial community in the context of massively escalating and unpredictable capital costs.
- An antiquated, chaotic and unpredictable nuclear licensing and regulating system --- a system which added construction scope, prolonged schedules and uncertainty in a period of high inflation and high cost of money.

- Erosion of public and political support.

- Utility management difficulties in absorbing a new, largely unstandardized, technology in the face of this bewildering array of institutional maladies.

My point, Mr. Chairman, is that, although the technology has performed well, the institutional structure -- the labyrinth of entities which supply, operate, finance and regulate the enterprise -- has not. And the regulatory apparatus, while it is not the only malefactor, is certainly a dominant one.

THE NEED TO STANDARDIZE THE PRODUCT AND THE PROCESS

We are faced with a situation where a perfectly sensible and necessary energy option may be denied further deployment in the United States. The current nuclear regulatory process and apparatus were established over thirty years ago to meet the requirements of a time when the technology was developmental, when applications for permits and licenses were few, if any, and when custom design and custom regulation were appropriate. The 1954 Atomic Energy Act has been revised from time to time, but its basic structure with regard to licensing is antiquated and is not appropriate for a mature energy industry. The industry and NRC are locked into a chaotic "design-and-regulate-as-you-go" process, which affords no predictability to investors and which may actually detract from safety.

From my perspective, nuclear licensing reform is a prerequisite for the next domestic nuclear plant order, and is vastly more important to the future of nuclear power in the U.S. than federal spending on developing advanced nuclear systems. Industry and the financial community must have the confidence that nuclear plants will be allowed to go into operation on a predictable schedule if these plants are erected as designed and approved by the NRC.

While there is time, we must take steps to standardize the product and the process, and to reform and improve the practices of the regulated and the regulators. Congress must mandate a predictable and standardized regulatory process. Industry must commit to standardizing the product. Custom, one-of-a-kind designs invite custom regulation.

The nuclear industry is moving on its own to standardize the product. For example, Arizona Public Service Co.'s Palo Verde Unit #1 has recently been licensed to operate by the Nuclear Regulatory Commission after it referenced a pre-approved Final Design Approval held by Combustion Engineering for its System 80™ standard design - the first and only time this procedure has been used in the United States. Prior to unanimously voting the 100% Power License for Palo Verde, the NRC Commissioners praised the project, calling Palo Verde "the plant of the future" and representing "the wisdom of the standardization approach."

Combustion Engineering's System 80 is the only reference standard design which has not only been approved under the existing NRC regulations but has actually been constructed and operated. Combustion Engineering has thus achieved standardization. As a result, we are currently able to offer an NRC-approved standardized design, which has been proof-tested and operated at Palo Verde. Unfortunately, however, the process is not available for us to do so.

If the process were available, we would offer our design with all of our usual warranties but without all of the custom-design-as-you-go engineering that was typical in the 1970's.

Another example of the industry moving on its own to standardize the product is the Advanced Light Water Reactor Program being conducted by the Electric Power Research Institute. The program's objective is to prepare standard specifications for the design of the next generation of nuclear reactors in the United States. Combustion Engineering is pleased to be a leading participant in that program.

As I have said, industry is moving on its own to standardize the product, but standardization of the licensing process calls for action by Congress. Although the Nuclear Regulatory Commission has been slowly moving to implement many of the proposed reforms on its own, the U.S. utilities and nuclear industry believe that such changes must have the support of Congress and the strength of law before they can again consider investing, over an extended period, billions of dollars in the nuclear option.

REFORM WILL ENHANCE THE PUBLIC HEALTH AND SAFETY RECORD

Licensing and regulatory reform is necessary for the continued viability of a nuclear economy in the United States as well as crucial to sustaining and enhancing the excellent public health and safety record of this technology. These are not mutually exclusive goals.

There is a popular notion that the various forms of legislation being proposed will somehow yield profit for the nuclear sector at the expense of public health and safety -- that streamlining the regulatory process will short-change public health and safety considerations and, further, that it will frustrate public participation in the regulatory process. Nothing could be further from the truth.

> In reality, the current legislative proposals will make public participation more meaningful and effective by encouraging public input early in the licensing process, before the momentum of a massive sunk investment clashes with public concerns voiced late in the process.

> Moreover, under the Standardization and Construction and Operating License (COL) provisions, there will be essentially complete designs to provide the basis for public review, as opposed to the haphazard piecemeal "design-as-you-go" process in which construction permits are sought with little of the design detail complete (and that subject to change).

Making societal decisions up front, under the standardization, siting, and COL provisions of the proposed legislation, serves all parties in the regulatory process -- the public, the ratepayers, the utilities, and the financial community [see Figure (1)].

At the heart of our current institutional problem is the heterogeneous and pluralistic way we have deployed nuclear power in this country. We have recently reached 100 operating nuclear units in the U.S. and by and large they are all unique: custom designed, custom manufactured, custom constructed -- and custom regulated. The standardization provisions of proposed legislation serves both the needs of the business community for more regulatory stability and the maintenance of our excellent record in public health and safety.

> Public health and safety goals are better served by focusing the regulator's technical resources on fewer standardized plants or systems, rather than a plethora of individualized designs.

The public health and safety goal is served also by requiring a more disciplined and systematic process for imposing retrofits in operating plants or plants under construction.

> A major concern with the current process is that a retrofit requirement in a subsystem may actually adversely impact the safety of the plant as a whole, and that the sheer accumulation of undisciplined retrofit requirements may lead to less, not more, safety.

Whatever one's persuasion is as to the efficacy of nuclear power, there seems to be a vast and growing broad based consensus that licensing reform is necessary to maintain and enhance the excellent public health and safety record of this technology. In the past half-decade, several panels have been convened to consider the nuclear licensing issue. These panels were not known for their knee-jerk, pro-nuclear positions on the issue. For example, President Carter appointed the Kemeny Commission after the Three Mile Island accident. A principal finding of the Kemeny Commission was:

> "To prevent nuclear accidents as serious as Three Mile Island, fundamental changes will be necessary in the organization, procedures and practices -- and above all -- in the attitudes of the Nuclear Regulatory Commission ... "

Similar or even more trenchant conclusions came out of the Babbit Committee, the Rogovin Study, and a host of other inquiries.

Even the regulators have concluded that the escalation of undisciplined regulation may lead to less, not more, public health and safety:

> "It is the finding, notwithstanding the competence and good intentions of the staff, that the pace and

> nature of regulatory actions have
> created a potential safety problem
> of unknown dimensions."*

The Commissioners themselves have underscored this sentiment in Congressional hearings.

The nuclear regulatory process is unstable, unpredictable, and out of control. This condition is not only debilitating to the business and technical sectors -- it may be harmful as well to sustaining the excellent record of public health and safety that this technology has achieved. Reform is needed. Reform is needed to enhance the excellent safety record as well as to reverse the retrenchment of the business community. Reform is a win-win, not a win-lose proposition.

---

* Nuclear Regulatory Commission Report, 1980

IS REFORM NEEDED NOW?

But is reform needed now? Is it an urgent problem? With a dearth of new applications, can't this issue wait?

Clearly we have a lull in licensing activity. The NRC case load is down. I believe, Mr. Chairman, that Congress should use this slack period to constructively reform and standardize the licensing process, free from the heat and pressure that a full NRC docket would bring. We have some time to perfect the process and this time should be used constructively.

Moreover, without nuclear licensing and regulatory reform legislation, it is unlikely that the utilities and the financial community will step up again and place major long term investments at risk. Absent reform legislation, nuclear power will not be available as an option for new generating capacity.

The present capacity buys us time to modernize the nuclear regulatory system, free from pressures and acrimonies. There is some time for each of the parties -- the utilities, their suppliers, the financial community, the public, the regulators and the Congress -- to take stock, to define their respective responsibilities and their respective requirements, and to design a regulatory process which serves all of this nation's interests.

THE KEY FEATURES OF LEGISLATIVE REFORM

A great deal of study and debate has gone into the subject of nuclear licensing and regulatory reform. Several legislative proposals, in fact, were made in the early 1970s by then-Commissioner James Ramey. Another Bill was prepared in 1978 by the Carter Administration. The Reagan Administration offered legislation in 1983, and it was my privilege, as Assistant Secretary of Energy, to represent that legislation before Congress. The Nuclear Regulatory Commission also proposed legislation in 1983. Hearings were conducted in both chambers of Congress in 1983. In 1984, Congressman James Broyhill, et. al., submitted compromise legislation before the House.

Early in 1985 Congressmen James Broyhill and Ralph Hall re-submitted Congressman Broyhill's 1984 proposal, and this was followed by a similar proposal by the Department of Energy in May 1985. A Nuclear Regulatory Commission proposal was submitted in March 1985. Each of the 1985 proposals deal in slightly different ways with the filigree of four basic elements of reform:

- Plant or subsystem standardization;
- Pre-approval of nuclear sites;
- Single step licensing -- the option of a combined Construction and Operating License (COL); and
- A coherent retrofit process.

I would like to take this opportunity to offer my views on each of the above features as they are addressed by the current legislative proposals from the Department of Energy and the Nuclear Regulatory Commission. First, however, I would like to comment upon the similarity of the three proposals. The current proposal from the Department of Energy is a "stripped down, no frills" version of the 1983 Reagan Administration Bill. It contains the minimum features necessary to streamline the nuclear licensing process. The most notable feature of the 1983 proposal that is not included in the 1985 model is the hybrid hearing process -- which was the source of considerable controversy during the 1983 hearings.

The Broyhill-Hall bill is very similar to the 1985 DOE bill. In general, I would consider the two bills to be equivalent, and I find it heartening that the Broyhill-Hall bill has received such strong bipartisan support from other members of the House.

The current proposal from the Nuclear Regulatory Commission has been considerably reworked from its 1983 version and, in my opinion, vastly improved.

There is now enough similarity between the three proposals that I am confident that Congress can quickly and efficiently move a Bill through markup and develop a consensus that can be enacted during this session.

My views on the key features of these proposals are as follows:

Standardization:

All three proposals direct the Commission to establish procedures to pre-approve standard designs for nuclear plants. They also provide the opportunity for public involvement in the licensing of standard designs. Public participation, as early in the licensing process as possible, benefits everyone -- the public, the Nuclear Regulatory Commission and the nuclear industry. To assure stability (by assuring finality), however, final Commission decisions must not be re-opened by insignificant and/or unfounded safety concerns during the construction or operation of a nuclear plant. All three legislative proposals provide a reasonable system for addressing any new safety issues.

There are a number of provisions in the Administrations's proposal, however, that provide a necessary degree of flexibility. For example, they direct the Commission to allow pre-approval of major subsystems in a plant design. A major subsystem would be sufficiently large in scope and function to avoid slipping back into custom designing, but yet small enough to allow meaningful competition in a free market.

Pre-Approval of Sites:

All three proposals provide for the early approval of a nuclear plant site, in a process similar to pre-approval of standardized designs. Again, they provide for early public participation, with a system for resolving new safety issues that may arise later in the licensing process.

Single-Step Licensing:

All three proposals provide for issuance of a single license to construct and operate a nuclear plant. There is a significant difference between the benefits of a standardized design and those that flow from a PRE-APPROVED standardized design. A pre-approved design is one that provides all of the necessary design details up-front and all regulatory approvals are in-place and all safety issues are resolved PRIOR to beginning construction.

Regulatory emphasis during construction would be placed on assuring that the plant is erected as per the licensed design, as opposed to participating in a design-and-regulate-as-you-go relationship with an applicant. Once more, the proposals provide for early - and more meaningful - public participation.

Retrofits:

The Administration's proposal provides a system by which the Commission may evaluate retrofits to licenses already issued by the Commission. (In the House, the Broyhill-Hall proposal provides for a similar system.) Please be assured that I am not calling for the removal of the ability of the Nuclear Regulatory Commission to require needed safety improvements. Rather, we in the industry have been requesting a rational and disciplined system for evaluating proposed changes to determine which should be required and which not.

Top NRC officials themselves have recognized the problem of cascading retrofits -- and responded, after years of debate, with a new Backfit Rule (effective November, 1985). Although this rule appears to have the features sufficient to address the retrofit problem, so did the previously existent regulation. Unfortunately, that regulation was simply ignored by the NRC staff, according to a report by the NRC's own Regulatory Reform Task Force (chaired by James Tourtellotte). To ensure the new regulation does not ultimately fall into similiar disuse, it is desirable that Congress provide statutory requirements which the Commission cannot ignore.

An approval on a standard design would be meaningless if it were continously retrofitted without reasoned restrictions. I believe that control of retrofitting is, in fact, the litmus test for standardization.

Hybrid Hearings:

Although the 1983 Reagan Administration bill sought to simplify the hearing process through the use of hybrid hearings, none of the current proposals seek such a change. Instead, they focus on providing early public participation and assuring that tests of reasonableness are considered before new issues are admitted to hearings late in the process. Assuming that these features remain in the legislation and achieve the desired goals, then the format of the hearing process becomes less important.

PRE-APPROVED STANDARDIZED DESIGN: HOW IT CAN BE IMPLEMENTED

I would like to take this opportunity to clear up some of the confusion which abounds as to how standardization can be effectively implemented by the nuclear industry and the NRC. As I stated earlier, Combustion Engineering's System 80^{TM} is the only reference standard design which has not only been approved under the existing NRC regulations but has actually been constructed, licensed and operated at Palo Verde. At Combustion Engineering, therefore, a standardized design is a reality, not an abstraction.

Based on C-E's over ten years of experience with standardization, I would like to provide you with C-E's insight into several of the questions which have been expressed with regard to implementation of a pre-approved standardization program.

A central issue in the debate over nuclear regulatory reform is the definition of plant standardization. I have noted that standardization serves both safety and economic purposes by focusing industry and regulatory resources on a few standardized designs rather than a plethora of custom designs. These public, ratepayer, and industry benefits cannot be fully achieved, however, if industry continues to offer custom designs. Custom design invites custom regulation. Industry cannot insist on regulatory stability -- standardization of the regulatory process -- while insisting on a dilute concept of what constitutes a standard design. We in industry cannot have it both ways. If the exceptions to standardization outweighs the body of standardization, then the concept is defeated.

The issue of what should constitute a standardized design breaks down into two closely coupled sub-issues:

- Scope of standardization -- how much of the plant can be standardized; and
- detail of design to be included in the pre-approval application to the NRC.

Scope of Standardization

The proposed bill before the Committee would authorize issuance of a Construction/Operating License only when all of the necessary information (nuclear plus balance-of-plant plus site) has been received, reviewed and approved by the NRC. No license will be issued if any information necessary to complete a safety review is unavailable in any of these areas. What seems to be in question, therefore, is the size and shape of the packages in which the NRC gathers and pre-approves that information.

In order to benefit, to the maximum extent possible, from favorable foreign experience with standardization -- and yet retain the advantages and improvements that come with a competitive economy -- some flexibility in the non-safety related portions of the design should be maintained. Since the nuclear portion of the plant generates and contains the radioactive material, it rightfully commands the most regulatory attention. As a result, the nuclear scope [see Figure (2)] needs to be the most standardized. Its pre-approval is, therefore, key to closing out each significant safety issue.

As can be seen in Figure (3) the process we envision for standardized plants would allow for "certification" and "banking" of nuclear and balance-of-plant designs, as well as sites.

The NRC would not issue a combined Construction/ Operating License (COL), of course, until a whole plant and site had been presented for its approval. Use of a certified (or pre-approved) system or site would simply eliminate the need for agency re-review prior to the issuance of the COL.

Level of Detail

A corollary issue is the level of detail to be provided to the NRC in an application for preapproval of a standardized design. We believe that all of the design details necessary to close out all of the safety issues should be provided to the NRC in the COL proceeding. A higher level of detail, specificity, and supporting analysis will, of course, be required where a high level of standardization (or "sameness") is required -- in the nuclear portion of the plant and its associated safety related systems.

Let me give an example to clarify this point. If two nuclear plants were built using the same standard design, the NRC should expect the reactor vessels in both plants to be identical because the reactor vessel is so important to plant safety. At the opposite extreme, however, the telephone system may look considerably different between the two plants because the telephone system has very little safety significance. Both telephone systems would fulfill an identical need but need not do so with identical hardware. It is certainly possible to standardize down to the level of detail of a telephone system -- but especially in the extreme case I have cited -- it would obviously not improve safety but would cost the ratepayers needlessly to do so.

During the NRC's review of C-E's System 80 standard design, we found that we could provide all of the necessary safety information and even well over ninety percent of the final information traditionally supplied by custom (non-standard) applicants for an Operating License. This was achieved for example, utilizing design information available from our Palo Verde, Washington Nuclear Project, etc., efforts and by conservatively enveloping the characteristics of potential plant sites in the U.S. The small remaining portion (less than 10%) consisted of information that the NRC did not really need, but had previously been supplied, simply because it was readily available in custom (non-standard) Operating License reviews. That information fell into three general categories: brand names and model numbers of equipment to be purchased from sub-vendors; "as-built" data, and the results of site-specific calculations.

Let me explain how we successfully resolved these issues by using the first category as an example. In our application for a Final Design Approval, the NRC asked for tables of the brand names and model numbers of instruments, valves, and pumps. The essence of the information they required was: the instrument's function; the quality control requirements applied to it; the environment in which it is required to operate; the source of power for the instrument; and so on. In the industry, we refer to this as the methods and procedures that will be used to design and purchase the equipment and the acceptance criteria that it must meet. This is the type of information that we successfully provided to the NRC for our System 80 design.

As it turns out this approach actually benefited the safety review process because the NRC received and focused on more detailed safety-related information than they had by simply looking at brand names. (The NRC can and will, of course, still obtain brand name information during construction of the plant by auditing the utility's files.)

An additional advantage of defining and documenting the methods, procedures and acceptance criteria is that the NRC's audits of plant construction will be better focused and thus be significantly more valuable. The inspectors will now know - in advance - what is important, what they are checking, and how to check it.

Changes in Technology

Some have argued that standardization provisions of the proposed legislation should await the "next generation" of nuclear plants, that is, await some quantum improvement in technology. I oppose this restriction. The problems confronting nuclear power in the U.S. today are institutional, not technological. The process, not the product, is disfunctional. Additionally, I cannot imagine how we would clearly define and legislate what constitutes this "advanced" nuclear plant; this would be a semantics nightmare. Finally, legislation on this point would be an intrusion into the market place. It would favor vendors that have held back, while punishing those of us that have already committed to standardization.

SUMMARY

Permit me, Mr. Chairman, to summarize my remarks as follows:

- Modernization of the nuclear licensing and regulatory process is necessary to preserve a vital energy option, and to sustain and enhance the nuclear industry's excellent safety record; both objectives are served by reform legislation.

- The public health and safety goal is served:

  - by focusing the nation's technical resources (both in industry and in the regulatory body) on fewer, standardized plants or systems, as opposed to squandering our technical resources on a plethora of custom designs;

  - by more effective public participation, early in the process before major financial resources are committed, and public participation with essentially complete designs and siting proposals in hand; and

  - by a more systematic review of retrofit proposals to assure that the net overall plant safety is enhanced, not degraded, by such proposals.

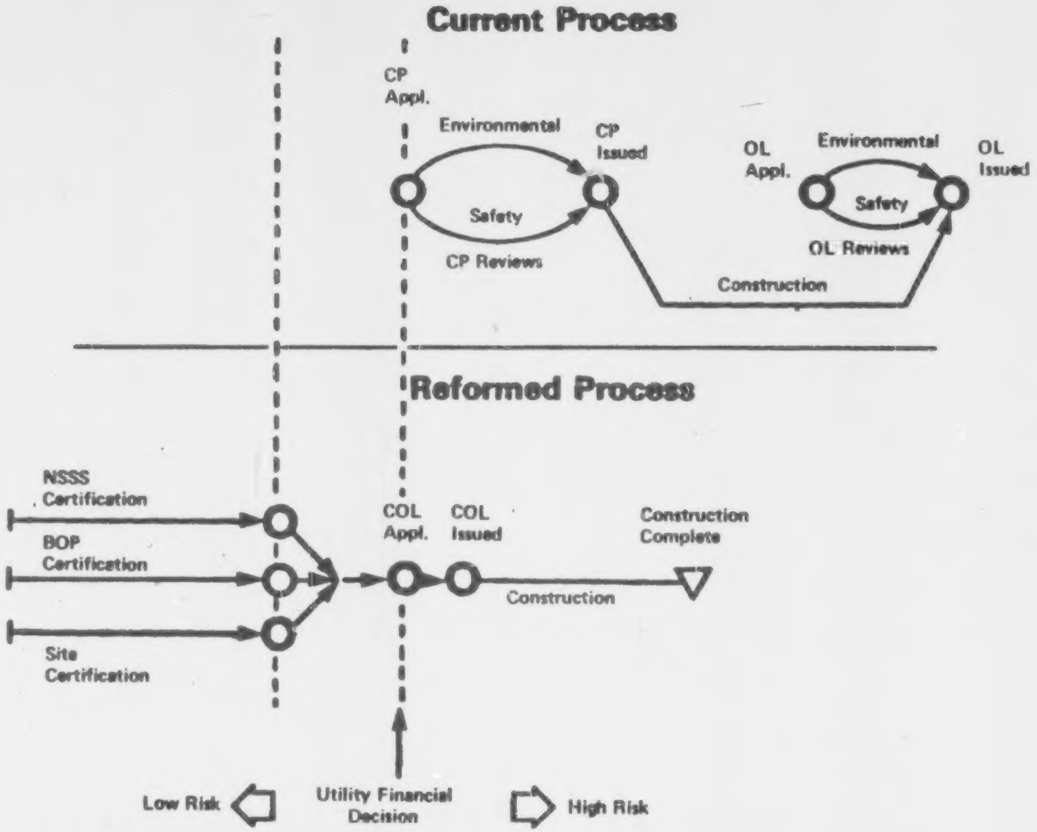
- The interests of investors, the utilities, and the suppliers will be served by a more stable regulatory environment; and, again, the public will benefit, from sustained safety at lower energy prices;

- Congress should make use of the lull in the NRC case load to perfect the licensing and regulatory process, rather than wait for a future in which pressures constrain reason or, worse, a future when remobilization of nuclear energy is no longer an alternative. The time for deliberate, careful Congressional consideration is now.

- The major outlines of the bills before Congress now are quite similar, differing only in emphasis and refined accommodations of checks and balances; debate over the past few years has served to converge the various proposals; therefore, I believe that Congress can efficiently move legislation through markup and develop a single bill that can be enacted during this session.

- The standardization provisions of the proposed bills can be readily implemented by the NRC and nuclear industry. Current experience with Combustion Engineering's standard design clearly provides the necessary proof.

NUCLEAR REGULATORY REFORM

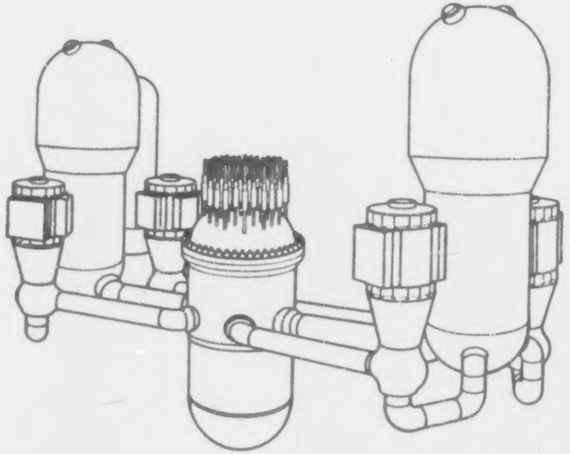

Current Process
CP Appl.
Environmental
Safety
CP Reviews
CP Issued
Construction
OL Appl.
Environmental
Safety
OL Reviews
OL Issued
Reformed Process
NSSS Certification
BOP Certification
Site Certification
COL Appl.
COL Issued
Construction
Construction Complete
Low Risk
Utility Financial Decision
High Risk

COMBUSTION ENGINEERING

FIGURE (1)

April 22, 1986

NUCLEAR STEAM SUPPLY SYSTEM



+

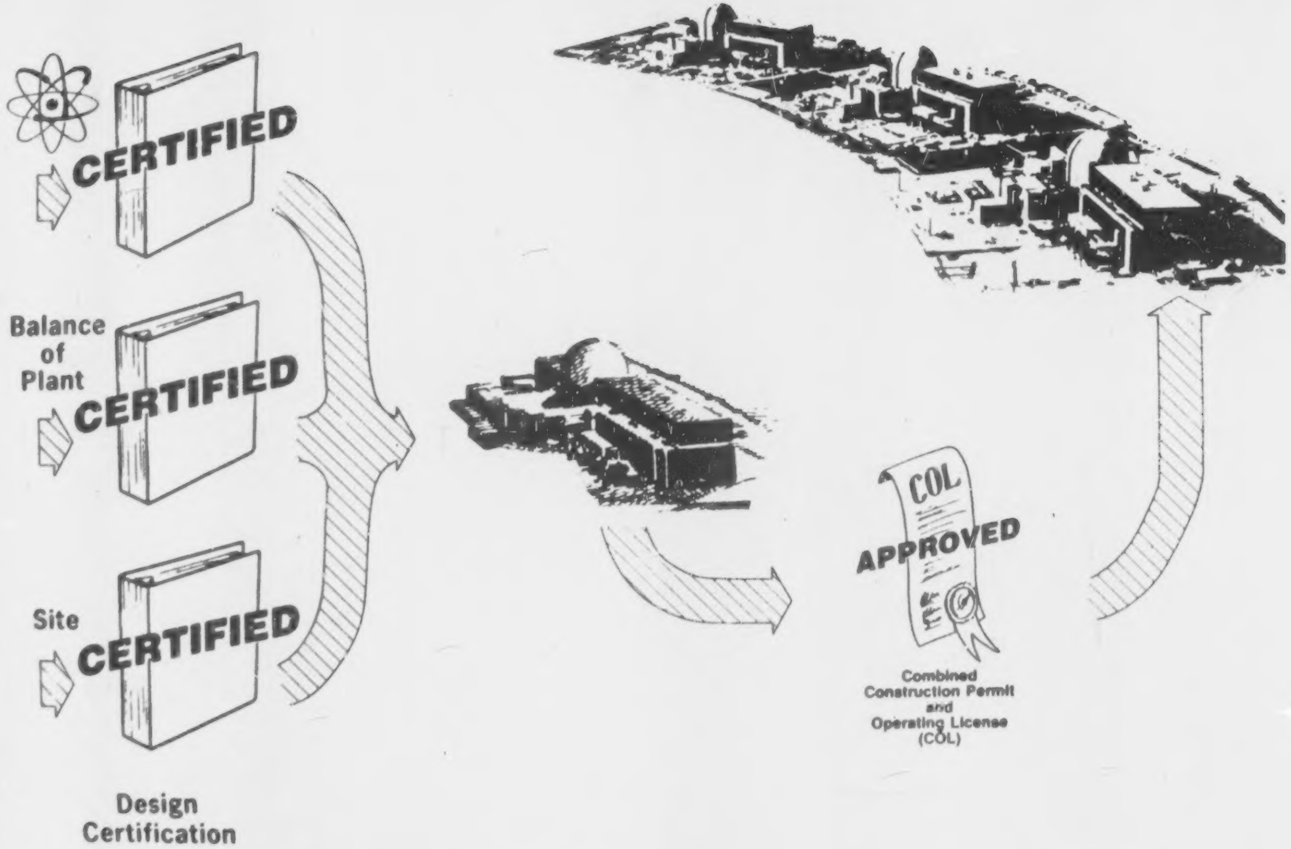
SCOPE OF SUPPLY

- Reactor Vessel Internals and Core Supports
- Fuel Assemblies
- Special Handling Equipment for Fuel and Reactor Vessel Internals
- Control Element Assemblies
- Control Element Drive Mechanism Power Supply
- Pressurizer Heaters and Control
- Pressurizer Safety Valves
- Equipment Supports
- Emergency Core Cooling System
- Main Control Room Panel Board and All Integral Equipment
- Process Instrumentation and Controls
- Instrumentation and Control Equipment Racks and Panels
- Reactor Protective Systems
- Supplementary Protective System
- Reactor Control Systems
- Neutron Monitoring System
- Chemical and Volume Control System
- Shutdown Cooling System
- Containment Spray System
- Spray Chemical Addition System
- Engineered Safety Features Actuation System
- Startup Test Program for NSSS
- Safety Analyses
- Design Provisions for Inservice Inspections

COMBUSTION ENGINEERING

FIGURE (2)

April 22, 1986


CERTIFIED
Balance of Plant
CERTIFIED
Site
CERTIFIED
Design Certification
COL
APPROVED
Combined Construction Permit and Operating License (COL)

COMBUSTION ENGINEERING

FIGURE (3)

April 22, 1986

The CHAIRMAN. Mr. Moore.

STATEMENT OF JAMES S. MOORE, VICE PRESIDENT AND GENERAL MANAGER, POWER SYSTEMS BUSINESS UNIT, WESTINGHOUSE ELECTRIC CORP.

Mr. MOORE. Thank you, Mr. Chairman. My name is James S. Moore, and I am vice president of the Power Systems Business Unit for Westinghouse Electric Corp. I would like to thank the Chairman and the committee for this opportunity to comment on the proposed legislation to modify the licensing process.

Beginning in 1983 electrical energy consumption began, an increase which has continued to date. The lack of current new generation projects coupled with likely Federal and State regulatory processes has raised utility concerns over their ability to meet customer demands in the 1990's.

The goals of the proposed legislation are to provide for standardized plants and to improve the licensing processes under which nuclear plants could be constructed in the United States in a 6-year period. Even if the price of oil and coal were to stay at today's low figures for generation, nuclear powerplants built in 6 years would not lose their edge in terms of cheap energy.

This 6-year schedule has been routinely achieved overseas using U.S. technology, preengineered and license designs and a one-step licensing process. In our case, this has been done with multiple designs, multiple customers, multiple countries. Based upon that experience, I don't share some of the concerns that have been expressed earlier in this hearing with respect to having more than one standardized design or the fact of the multiple utilities we have in the United States.

Westinghouse strongly supports the regulatory reforms proposed by the Department of Energy and the NRC. Although the two proposals differ, each would impose much needed discipline and stability in the regulatory process. The discipline that would be imposed is not applied just to the NRC but to the nuclear industry as a whole.

The industry needs firm congressional action in order to create an environment for utilities, suppliers and architect engineers to make forward-thinking investment decisions with reasonable certainty.

At this point, I would like to briefly discuss our views on each of the provisions of the proposed legislation, and although I will be addressing each of these provisions on its own merits, it is important that we recognize that these provisions form an overall approach to the regulatory process and that achieving the benefits depends on the combined effects of them taken as a whole.

First, we support the proposal for early site approval. Combining this provision with preapproved designs and protection from unnecessary back fitting will greatly reduce the cost and time required to bring nuclear powerplants on line and therefore is of significant benefit to the public interest.

An important feature of the licensing reforms proposed by the DOE is the provision for one-step licensing. A complete review with meaningful public participation should be required at the front end of the licensing process. Although the current process provides two opportunities for public hearings, it actually foreshortens public participation when compared to the proposed one-step format.

Today the construction permit hearing occurs too early to adequately evaluate the safety of the proposed facility, and the operating license is too late, since it takes place after the plant is almost entirely constructed and billions of dollars have been invested.

I believe that industry would undertake the expense of submitting a more detailed, standardized design earlier in the process if it could be assured that its consideration would be meaningful, as it would be under the one-step format.

The public would benefit greatly from a single early hearing on an essentially complete reactor design. Those who participate in the licensing process would have the opportunity to review a design once all of the safety requirements have been defined, yet before billions of dollars had been spent.

Under the DOE proposal, an applicant receiving a combined construction permit and operating license would have to satisfy a comprehensive list of requirements consisting of tests, inspections and analysis, each with specific acceptance criteria, before the plant could be placed in operation.

These requirements would be an integral part of the public hearing and the issued license and would constitute a checklist for the NRC's assurance that utility obligations are being met.

Furthermore, the DOE bill calls for a phased approval procedure for construction quality assurance. This concept of sign-as-you-go provides for NRC review and specified checkpoints throughout the construction process and assures that the plant conforms to the license as construction progresses.

Finally, we note that the DOE bill does provide an opportunity for a preoperational hearing if there is material evidence that the plant has not been constructed in accordance with its licensed provisions.

Taken as a whole, the above process would enhance public participation at a time when it is most meaningful. At the current time, public participants must wait to raise many of these issues until the operating license proceeding.

In conclusion, we, with the rest of the entire industry, support the DOE proposal and urge this committee to work for its passage into law. I would like to thank you again for the opportunity to testify before your committee and would be pleased to respond to any questions you may have.

[The prepared statement of Mr. Moore follows:]

TESTIMONY OF JAMES S. MOORE
VICE-PRESIDENT AND GENERAL MANAGER
POWER SYSTEMS
WESTINGHOUSE ELECTRIC CORPORATION
ON
SENATE BILL 2073

Before

THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

APRIL 22, 1986

My name is James S. Moore. I am Vice President and General Manager of the Power Systems Business Unit of the Westinghouse Electric Corporation. I wish to thank the Chairman and the other members of this committee for this opportunity to express our views on the proposed legislation to modify the licensing process. My personal experience participating in all phases of that process, including licensing and rulemaking hearings for the past 25 years, convinces me that changes similar to those being proposed are essential if the benefits of nuclear power ar to continue to be available to the American public.

Westinghouse is a world leader of long standing with extensive experience in all major aspects of the nuclear business. We are in the unique position of having designed more nuclear reactors than any other reactor vendor in the world. Thus, we have accumulated the most direct experience with practically all phases of the licensing process in the U.S. and worldwide. As a result, we have a broad perspective on how licensing affects nuclear power plant design, construction, and operation. It is on this experience that I base my remarks today.

In the last several years significant changes have occurred in the nationwide energy forecasting picture. These changes have their root in the energy demand decline that took place from 1980 to 1982. Actual electrical energy usage for that period declined by 0.4 percent. This decline, exaggerated by the intense energy and electrical conservation that took place throughout the U.S. at that time, inspired a depressed forecast. Analysts tended to assume that this decline would steadily continue and forecasts to the end of the century were based on these considerations.

However, beginning in 1983, electrical energy consumption began an increase which has continued to date. This upswing has some utilities seriously questioning their decisions to avoid building additional generating capacity.

An article that appeared in the June 17, 1985, Wall Street Journal effectively sums up the concerns now facing many utilities. Mark D. Luftig, a utility analyst with Salomon Brothers, was quoted as saying the areas likely to be hit hardest by sudden increased demand are the Southwest, parts of the East Coast, and parts of the Northwest. In the New England area, according to Samuel Huntington, President and CEO of New England Electric, there may be a need for new generating capacity by 1995 in spite of his company's aggressive conservation program. Charles A. Lenzie of Nevada Power stated that new capacity in his area is justified now, but that regulatory uncertainties had to be resolved before his utility would commit to construction of any type.

In this environment where new capacity is being considered, the future of the U.S. nuclear option is vital. A study published by the Ford Foundation, "Energy: The Next Twenty Years," made the significant point that when any major energy option, such as nuclear power, is ruled out, the strain on the options that are left increases dramatically. Furthermore, none of the other conventional electrical generating options - coal, oil, hydro - is without problems of the environmental, economic or technical variety.

The recent decline in the price of oil, as well as a lowering of the price of natural gas and internationally traded coal, has led some people to question whether nuclear power will be needed in the future. I believe that it will be. An article in the March 29, 1986 issue of The Economist places this matter in proper perspective. The Economist stated that "[o]nly by investing heavily in nuclear power today can the world be sure of avoiding high-cost energy in the 1990s and beyond." The Economist went on to warn that the new era of cheap energy should not lead to complacency, stating that "the time to repair the roof is when the sun is shining." Several observations of The Economist have an important bearing on the licensing legislation currently before your committee. One of the goals of the legislation is to provide for standardized plants and improving licensing processes under which nuclear plants could be constructed in the United States in a six-year period. The Economist noted that even if the price of oil and coal were to stay at today's low figures for a generation, nuclear power plants built in a six-year time frame would not lose their edge in terms of cheap energy.

Attached to my testimony are two articles which appeared in the November 1985 issue of Nuclear Energy Digest published by Westinghouse. Those articles discuss how a six-year construction cycle has been achieved in other countries and how a process allowing early decisions and one-step licensing is essential to achieving this result in the United States. I want to emphasize to you that Westinghouse remains firmly committed to the future of nuclear power. Our commitment is exemplified by our involvement in the development of a new generation of nuclear power plant design - the Advanced Pressurized Water Reactor (APWR). This is a major cooperative effort with the Mitsubishi Company of Japan, one of our licensees, and a consortium of Japanese utilities. We view this as an exceptional opportunity to make evolutionary changes in design based on our many years of experience with existing PWR designs. Our goal is to develop an improved plant design which is simpler, inherently safer and more cost effective. Among the benefits which we see in the APWR are improved plant availability, reduced worker occupational radiation exposure and increased design margins.

An example of the improvements which we are designing into the APWR are changes in the emergency core cooling system which ensures that in the unlikely event of a small pipe break, the reactor core will not be uncovered. This almost eliminates the potential for release of radioactivity from the core as a result of such events, and at the same time, signficantly reduces the risk of economic loss from such events.

We also believe it is necessary for a single agent to be responsible for all aspects of safety-related plant deign and construction and we intend to do this. In doing this, we intend to provide an exceptional level of design and construction control using state-of-the-art computer aided engineering techniques which we pioneered in the nuclear industry in the field of piping and piping support design and analysis.

Finally, we are seeking maximum regulatory accreditation of the design and construction control process in the context of a reference standard plant. In that regard, we have initiated a major U.S. licensing program intended to lead to one-step license certification of a total final plant design. In effect, we are anticipating a favorable regulatory framework which is synergistic to our efforts. Without this underlying framework of regulatory reform to provide the certainty and stability necessary, we may lose this exceptional opportunity.

Westinghouse strongly supports the regulatory reforms proposed by the Department of Energy (DOE) and the NRC. Although the two proposals differ somewhat, each would impose much-needed discipline and stability in the regulatory process and would create an important incentive for the development of enhanced nuclear power plant designs. The discipline that would be imposed does not apply just to the NRC, but to the nuclear industry as a whole.

Discipline is needed in all phases of the process on the part of all the participants - the industry, the NRC and the interested members of the public. The proposed legislation will foster that discipline and provide the certainty and stability now lacking in the licensing process. The present Commission is attempting to modify the licensing process to the extent they can without legislation. However, the industry needs a firm base of Congressional action in order to create an environment that would enable utilities to make appropriate and forward-thinking investment decisions.

Historically, the U.S. has been a world leader in nuclear technology and the NRC has been the leader in setting safety standards and criteria. These technological leadership positions were won and maintained through vigorous technical and regulatory activities in the U.S. This, especially in the early years of nuclear development, enabled the U.S. to achieve an early lead on its international competition. We now have more commercial nuclear power plants in operation than any other country in the world. Currently there are 101 nuclear plants licensed to operate, with the prospect of this rising to approximately 120 in the next five years. This means that the cumulative U.S. experience can be expected to far exceed that of any of the international competition for quite some time. We must have a rational approach to factoring that experience into regulatory requirements if we are to expect other countries to respect our judgments.

U.S. regulatory requirements, including many of the U.S. codes and standards, were adopted virtually verbatim worldwide during the emergence of the nuclear power industry. But while everyone essentially integrated the regulatory requirements into their own regulatory system, they did not adopt the U.S. licensing process. Most countries developed their own, which appear to be more efficient processes. Three other major nuclear-committed countries - Great Britain, France and Japan - each have a licensing procedures that solve substantive issues at the early stages of a project, employ cost-benefit backfit methodology, and provide for early public participation in a constructive, disciplined manner. This efficiency and sensibility has created environments in which nuclear plants can be constructed in half the time it takes utilities in the U.S.

The U.S. nuclear industry must be able to compete successfully in the international market during the current hiatus in domestic nuclear power plant orders in order to ensure our ability to respond when the domestic market returns, as I am sure it will. Furthermore, participation in the international marketplace will ensure our continued ability to be able to respond to our customer's needs for services in connection with those plants that are operating. Action by the Congress to provide the needed reforms in the regulatory process will be a strong signal to the international nuclear community that the U.S. intends to continue to be a reliable supplier of nuclear power plants and associated equipment and services and to continue its technological and regulatory leadership. While this will not by itself ensure our success in the international market, it will remove what has become a major impediment to that goal.

I want to give you some figures which illustrate the overall importance of the international market to the American public in terms of employment. A single nuclear power plant export award represents approximately 15,000 man-years of direct employment plus another 15,000 man-years of indirect employment spread over a 6 or 7 year design and construction period. Over the lifetime of the plant after it goes into operation, as many as 30,000 man-years of additional employment may be provided through the supply of replacement fuel, components and technical services. This means jobs for engineers, technicians, factory workers and construction workers. It would be a shame to let this opportunity to increase employment opportunities for American workers slip away through inaction.

At this point, I would like to discuss our views with respect to each of the provisions of the legislative proposal which you are considering. Although I will be addressing each of these provisions on its own merits, it is important that you recognize that these provisions form an overall approach to the regulatory process and that achieving most of the benefits depends on the combined effects of them taken as a whole.

Early Site Approval

This important provision would allow an applicant to obtain approval of sites for nuclear power plants from the NRC without committing to build a particular facility, and even before he has selected any specific plant design. We support this proposal. Combining this provision with a provision for preapproved designs would significantly enhance a utility's ability to obtain permission from the NRC to begin construction because most of the major decisions necessary for such permission would already have been made. Thus adoption of this provision will enhance regulatory stability and predictability.

Approval of Designs

Emphasis on standardization, to limit the number of different designs requiring review and approval and to avoid unnecessary rereview and relitigation of issues, is of obvious benefit to utilities and consumers as well as to the nuclear industry. Preapproved plant designs, particularly if utilized in connection with preapproved sites and protected from unnecessary backfitting, have the potential to greatly reduce the cost and time required to bring nuclear power plants on line and are, therefore, a significant benefit to the public interest.

Nuclear power plants have demonstrated an exceptional record of economic and safe operation. This does not mean, however, that there cannot or should not be further improvements. It must be recognized that any regulatory process has a built-in bias favoring the status quo. Once regulatory approval has been obtained for some activity, there is a strong disinclination to do anything to upset that approval and require rereview. The more cumbersome and uncertain the regulatory process, the greater is the disincentive. On this basis alone, we believe that the regulatory reforms being proposed have considerable potential for encouraging improvements. It is very important, in considering legislation to improve the regulatory process, that we eliminate, wherever possible, existing stumbling blocks and to avoid creating new ones.

Licensing Stability

No one could be opposed to backfitting when the expenditure of time and resources for such actions are justified on the basis of the overall benefits to public health and safety. On the other hand, the absence of a rational evaluation process prior to imposing backfits and the adverse, cumulative effect of multiple backfits, should be a concern.

One-Step Licensing

An important feature of the licensing reforms proposed by the DOE is a provision for one-step licensing. This improvement would, in itself, go a long way toward reforming the regulatory process. It will provide, moreover, for increased public participation in the nuclear licensing procedure.

I would especially emphasize the relationship between standardization and one-step licensing. The proposed legislation provides for standardization in its provision for pre-approval of designs. For such pre-approval to be effective, however, it should be coupled with a one-step licensing process. When a standardized design has been approved, it is essential that those items relating to the design and the public health and safety not be subject to reconsideration after the standardized plant has been constructed and the large investment made. A complete review, with meaningful public participation, should be required at the front end of the process. Thereafter, the benefits of standardization can accrue only if the license constitutes approval to construct and operate the plant.

The current process satisfies no one. Although it provides two opportunities for public hearings, it actually foreshortens public participation when compared to the proposed one-step format. The construction permit hearing occurs too early to adequately evaluate the safety of the proposed facility and the operating license hearing is too late since it takes place after the plant is almost entirely constructed and billions of dollars have been invested. The length of time that currently exists, from the time a facility is planned until the time it becomes operational, needlessly adds hundreds of millions, if not billions, of dollars to the cost of a plant. And I do not hesitate to add that the consumer ultimately pays this cost in electrical bills. These avoidable delays are caused in part by the licensing process and the threat of activating dilatory, undirected, obstructive litigation encouraged by the process. There are three significant disincentives to the provision of detailed design information in the existing process: (1) the added expense in terms of cost, time and resources which it would take to submit a detailed design prior to the issuance of the construction permit; (2) the essential meaninglessness of submitting such information given the substantial likelihood that the NRC would order major modifications to that design once construction began; and (3) the possibility that the design would be relitigated at the operating license stage anyway.

I believe that industry would undertake the expense of submitting a more detailed design earlier in the process if it could be assured that its consideration would be meaningful, as it would be under the one-step format.

My conversations with utility executives confirm this view. The significant advantage of the one-step process for utilities is permitting them the opportunity to plan for the future with confidence. Under the current regulatory process, a utility ordering a nuclear plant does not know how much it will cost, or how long it will take to complete, two factors which, I might add, are interrelated. The longer it takes to build the plant, the more it will cost since the debt incurred will have to be financed over longer periods of time. For a plant nearing completion at the current time, interest charges alone are more than a million dollars a day.

I have attached to my testimony five sheets (A-1 through A-5) which diagram the proposed one-step licensing process which is included in the DOE proposal. These diagrams demonstrate the degree of discipline the DOE proposal brings to the process, how it actually increases the ability of representatives of the public interest to participate in a more meaningful way, and why there should be no need for an automatic opportunity for a public hearing when the plant is ready to go into operation - a time when the costs of unnecessary delays are staggaring.

The public would benefit greatly from a single early hearing on an essentially complete reactor design. Those who participate in the licensing process would have the opportunity to review a design for which all safety related requirements have been defined, yet before billions of dollars have been spent on the facility and significant changes in the plant are difficult, if not impossible, to make. Consumers generally would benefit from less expensive plants. Not only would the plants cost less because of the fewer number of backfits which would be required during construction, but the plant would become operational more rapidly, thereby significantly reducing the time during which interest would have to be paid on the debt incurred to build it. Consumers also would benefit from the added assurance of access to adequate electricity supplied at reasonable rates to support regional economic growth.

Westinghouse believes so strongly in the benefits of a one-step process that we have initiated with the NRC a major licensing program to lead to one-step certification of the Westinghouse Advanced Pressurized Water Reactor. Once this certification is complete, utilities will be able to provide the NRC with an essentially complete design at the beginning of the licensing process.

Under the proposal contained in the DOE bill, an applicant receiving a combined construction permit and operating license would have to satisfy a comprehensive list of requirements--consisting of tests, inspections and analyses each with a specific acceptance criteria--before the plant could be placed into operation. There is a sound basis for concluding that the issues of emergency planning, management ability and operator training can be dealt with in this context. Indeed, the early resolution of these issues would seem preferable. The time to determine whether emergency planning is feasible for a specific site is prior to the time billions of dollars have been spent. Likewise, the ability of a utility to manage the project should be concluded as early in the process as possible. If deficiencies in these areas are found later, the NRC and the public will have ample opportunity to deal with the situation.

By utilizing the required inspections, tests and analyses, and the acceptance criteria, as a detailed checklist, the Commission will be able to make certain that an applicant complies with its license obligations. With the increased discipline thus provided, the Commission staff will know if, during construction, any requirement is not met and if the deviation affects safety. Where the Commission staff finds a deficiency during construction which affects safety, the Commission will be able to take the necessary action (including, where appropriate, enforcement action) to make certain that the plant conforms to the license and meets the statutory standards.

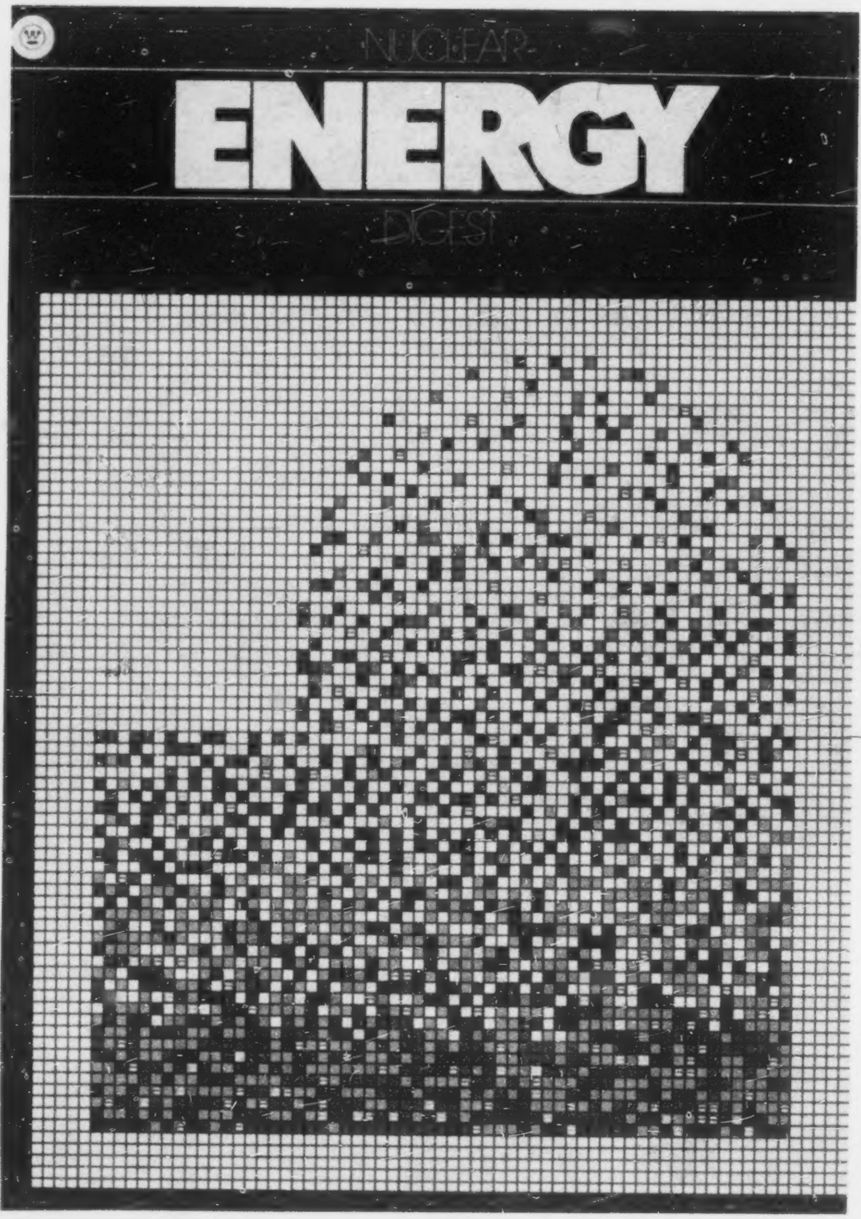
The DOE bill calls for the incorporation into each combined construction and operating license a "phased approval procedure for construction quality assurance." Westinghouse believes that this concept of "sign-as-you-go" is inherent in the providing for inspections, tests and analyses and related acceptance criteria as part of the combined construction and operating license. Such a "sign-as-you-go" procedure for construction quality assurance ensures appropriate Commission review at specified check points and thus provides additional assurance that the plant conforms to the license and meets statutory standards.

Further, the DOE proposal authorizes the Commission to provide for inspections by licensee "designated quality assurance inspectors and designated engineering and inspection representatives as well as by Commission inspectors." Westinghouse also supports this proposal which is similar to the concept successfully applied for many years by the Federal Aviation Administration to assure aircraft safety.

Does this process significantly curtail public participation? On the contrary, we believe it would enhance public participation. The inspections, tests, and analyses, and the related acceptance criteria will be considered during the hearing on the combined construction permit and operating license, and will be included within the license. Thus, the public will have an opportunity to participate when the participation would be most meaningful. The public will, furthermore, retain the right to utilize Section 2.206 of the Commission's regulations, which permits it to raise issues before the Commission in the absence of an ongoing licensing proceeding. At the current time, public participants--aside from using Section 2.206--must wait to raise these issues until the operating license is issued, which usually is too late to meaningfully address responsible issues. In addition, the public's right to participate in this early hearing means they can influence the comprehensive list of requirements which must be met before the plant will be placed into operation. I would suggest this gives public participants greater ability to affect the design of the facility than they have under the current process.

Conclusion

For all of the reasons I have stated, we support the DOE proposal and urge this Committee to work for its passage into law. Certain technical changes and amendments could be made which we believe would improve the bill. I would be pleased to supplement my testimony and provide the Committee with our suggestions for such changes. I want to thank you again for this opportunity to testify before your Committee. I would be pleased to respond to any questions you may have at this time.



NUCLEAR

ENERGY

DIGEST

READY TO BEGIN AGAIN

The nuclear industry in the United States has reached a pause – a period of reflection. We have come to a time when the headlong rush of nuclear energy's first 25 years pulled up, took a breath, and provided an opportunity for some of us to look back and find ways to improve the performance of our industry.

Looking back, the industry can be proud of many spectacular successes. We are infinitely more competent in the nuclear field than we were 25 years ago. That competence, that mature understanding of nuclear energy, is a kind of opportunity which far exceeds anything that lay before us in our earlier developmental days.

In this nuclear lull, this pause before we begin again, we must apply our quarter-century of hard-earned competence to the next-generation of nuclear plants – plants that can be built within six-year schedules right here in the United States as they are abroad.

There are those who believe that nuclear energy is no longer a viable option for meeting America's future energy needs. They base that belief on the construction delays and financial difficulties of the past and present. Let me take issue with that belief.

The idea of a six-year construction period is neither a fond reminiscence of past achievements nor a fantasy of the future. It is firmly planted in reality.

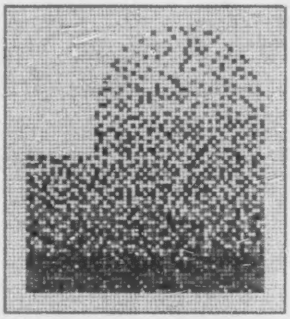
The six-year plant is crucial to the future of the nuclear industry. I believe that the only real obstacle to the early return of nuclear power is its present reputation for being a power source with seemingly endless front-end costs brought on by excessive construction delays. Nuclear energy and economic controversy have become inseparable ideas. But it does not have to be that way. We at Westinghouse are convinced – absolutely convinced – that it is possible to shake free from the costly construction uncertainties of the immediate past and the present.

The cover story of this magazine defines the Westinghouse approach to six-year plant construction. Other articles analyze U.S. electrical consumption versus capacity and describe recent U.S. public acceptance trends. Each of these articles addresses issues which are intertwined with the others. Partnership and cooperation among the various participants in the nuclear industry – utilities, suppliers, regulators, customers and financiers – will affect each of these issues in a positive way.

Partnership requires a certain amount of risk-sharing. When Westinghouse proposes the next new plant project in the United States, we will offer to share the risk of building the plant in relation to our responsibility. We will propose that everyone who takes part in the project enter the partnership and share that risk. The profits of the participants should be based upon top-notch performance. We also will propose that legislative, regulatory and financial decision-makers reduce the risks for everyone involved by making early commitments and endorsements and issuing timely approvals.

These key words – partnership, risk, benefit and performance – are the heart and soul of Westinghouse thinking today on nuclear energy. Properly applied, they are strong reasons to believe that the nuclear option is still viable.

James S. Moore
Vice President and General Manager
Water Reactor Divisions



ACHIEVING PLANT CONSTRUCTION IN SIX YEARS

It's time for some straight talk about the future of the U.S. nuclear industry. If the nuclear option is to maintain its place in meeting America's increasing energy needs, plant construction projects must become considerably more efficient and economical.

Plant construction, past and present, has been analyzed and criticized long enough. The causes and the effects of construction delays and cost overruns are clear. Every utility and every nuclear supplier knows the pitfalls, the challenges and the financial risks involved in plant construction.

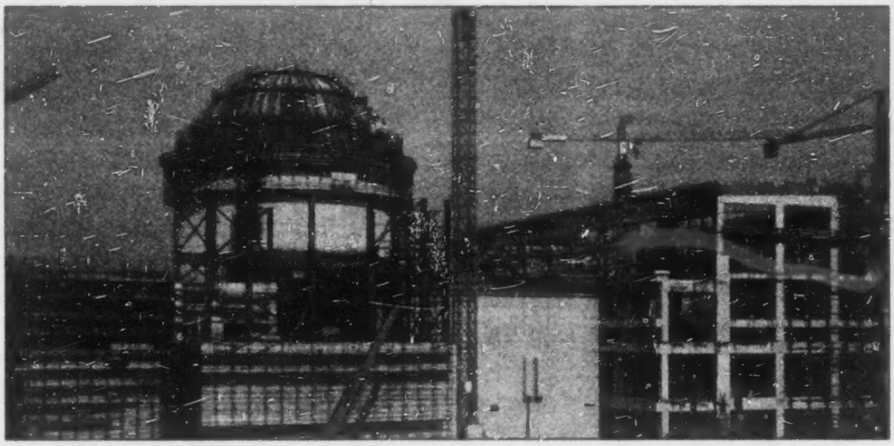
The industry has learned the value of time. Anything that adds time to a project – lack of cooperation and incentive among parties, incomplete designs, drawn-out licensing procedures, rework and backfits – ultimately increases the cost of the finished plant and threatens to make the nuclear option a less desirable choice.

Thirty years of social, political and economic change in the United States have contributed greatly to the current state of the industry. Learning from the negative, as well as the positive changes, will be the solution to turning the industry around.

"The problem in the industry has not been change. It has been the management of change," says Nat Woodson, General Manager of the Westinghouse Nuclear Operations Division. "The industry hasn't always dealt with change in the best possible way.

"We are no longer doing business in the 1960s or early 1970s. America has changed significantly. We must redirect our activities. It is obvious that this society will not support or endorse another 10- to 15-year nuclear construction project."

[illegible]



The Six-Year Plan

According to Woodson, a six-year plant project would be ideal.

Such a plant already exists. Project managers overseas and in the United States have constructed plants in six years or less. For example, Korea Electric Power Company built Korea Units 5 and 6 in 60 and 64 months, respectively, from first concrete pour to core load. Taiwan Power Company constructed Maanshan Units 1 and 2 in 66 and 69 months, respectively, based on the same milestones. During the past 15 years, as a total turnkey and nuclear island turnkey supplier, Westinghouse has produced 20 plants on average construction schedules of 61 months. One U.S. utility, Florida Power and Light, overcame post-TMI constraints to construct St. Lucie Unit 2 within six years.

Clearly, the methodology and technology for building such a plant already exists. What does not exist is an industry-wide commitment to make it happen consistently in the United States.

"Let's not kid ourselves," says Woodson. "We have never achieved real teamwork in the U.S. nuclear industry."

The electric utility is no longer the sole decision-maker for building new baseload generation. In the past, the utility decided when to build, where to build and how much to build. Today's nuclear projects are dictated by a much larger cast – the utility, its supply organization, financial groups, state and federal regulators – each with the potential to make or break the project by what it contributes.

> *"Time needs to be managed. Westinghouse sees partnership as the one and only solution for managing time."*
>
> *Nat Woodson, General Manager, Westinghouse Nuclear Operations Division*

"Time needs to be managed," according to Woodson. "Westinghouse sees partnership as the one and only solution for managing time. Today's utility needs the support and cooperation of its supply organization and all of its external decision-makers in order to plan a six-year schedule and stick to it.

"We're not describing a commercial relationship in which we call ourselves partners when we really mean favored suppliers. We're describing partnership in its classic sense – a business relationship which involves the mutual sharing of risks in the mutual expectation of a benefit."

The key link between "risk" and "benefit" is "incentive." For the six-year plan to work, each partner must assume a financial or political risk. Each must have the incentive to do whatever is necessary to keep the project on schedule and within budget. Ultimately, each partner will share the benefits of a safe, reliable nuclear unit.

Getting Ready To Build

The Westinghouse approach to six-year plant construction is focused on anticipating and defining the needs and costs of the project before making a long-term commitment. It is designed to accomplish as much as possible prior to substantial financial investment. It is aimed at minimizing risks once the funds are committed.

In short, plant designs and construction decisions must be confirmed long before the first shovel ever breaks ground.

All of these activities will, of course, hinge on two major determinations: whether or not the need for increased generating capacity exists and whether that need warrants a new plant construction project.

"Utilities are well aware that there will be a substantial need for increased baseload capacity in various regions of the United States as early as 1995," says Woodson.

Examples of Westinghouse Six-Year Successes

Project/Country	Schedule (Months)	Westinghouse Scope
KRSKO – Yugoslavia	72	Total Turnkey
Napot Point – Philippines	69	Total Turnkey
KORI 1 – Korea	60	Total Turnkey
KORI 2 – Korea	63	Nuclear Island Turnkey
Takahama 1 – Japan	46	Nuclear Island Turnkey
Ringhals 3 – Sweden	58	Nuclear Island Turnkey
Ringhals 4 – Sweden	58	Nuclear Island Turnkey
OHI 1 – Japan	61	Nuclear Island Turnkey

Based on First Concrete to Ready for Core Load

"Although utilities have been reluctant to enter into new construction projects, based on some of the construction problems of the recent past, I believe that most utilities endorse and support the safety, high availability and low fuel costs of the industry's present operating nuclear plants. We hope to see more such plants in the future, by proving that new plants can be built in six years.

However, before any new construction project can even be considered, the utility must first establish and define its future power needs and obtain the endorsement from the state authorities that the need is real and that it justifies additional base-load generation. Reaching this mutual decision begins with early and frequent communication among the utility and its authorities.

Establishing the need for power is a logical starting point for the utility. Unfortunately, this determination hasn't always been clearly defined and agreed upon during the early stages of many previous projects. Since state regulators have the authority to prevent a proposed plant from being built, to cancel a project or to prevent construction costs from entering the rate base, it is absolutely essential that these decision-makers support the utility's positions.

Consider the case of Pennsylvania Power and Light's Susquehanna Unit 1. The Pennsylvania Public Utility Commission disallowed millions of dollars of the plant's construction costs from entering the rate base because the PUC felt that the unit provided excess capacity. In the case of Philadelphia Electric's Limerick Unit 2, the Pennsylvania PUC has tried repeatedly to cancel the project on the grounds that it fulfills no apparent need.

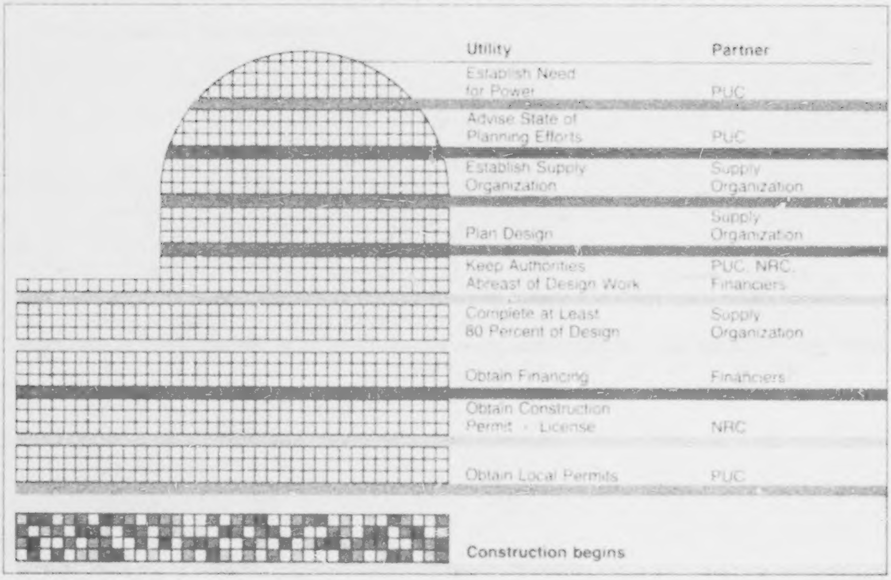
These types of situations can be avoided only by obtaining a clear understanding among the utility, the state authorities and the community that the need for power exists. Once that need is agreed upon, the utility can begin to think seriously about an actual construction plan.

The utility should advise the state and local authorities of its building plans as early as possible and keep them informed throughout the entire planning process. The authorities do not have to make a firm commitment to construction at this early stage, but they should be willing to approve the costs of the planning and engineering tasks.

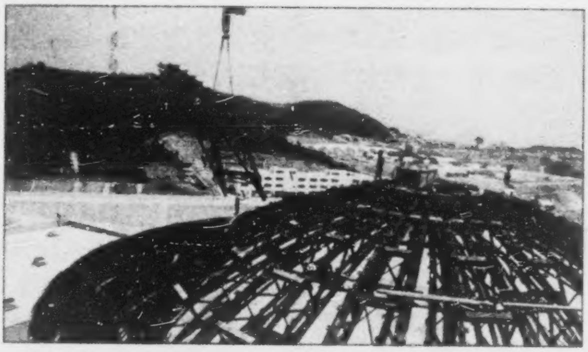
With the need for power established and the planning efforts endorsed, the utility has taken a big step toward eliminating unnecessary costs, cancellations and uncertainties down the road.

The next stage in the utility's planning process includes the selection of a qualified, experienced supply organization — one that will share the utility's project risks and benefits by defining a scope of work, taking responsibility for managing that scope and performing high-quality work within the agreed-upon schedule and budget. The risks and the benefits provide the incentive to meet these objectives.

Clearly, the utility will no longer bear financial risks and construction uncertainties on its own. That is why it is so important to choose a



Utility	Partner
Establish Need for Power	PUC
Advise State of Planning Efforts	PUC
Establish Supply Organization	Supply Organization
Plan Design	Supply Organization
Keep Authorities Abreast of Design Work	PUC, NRC, Financiers
Complete at Least 80 Percent of Design	Supply Organization
Obtain Financing	Financiers
Obtain Construction Permit - License	NRC
Obtain Local Permits	PUC



responsible supply organization. The utility may choose a turnkey or energy systems supplier like Westinghouse, with various sub-tier suppliers, or a joint venture composed of several suppliers. Either way, the utility should expect all its major suppliers – project manager, architect-engineer, NSSS supplier, civil contractor – to join together and to share the risks for their respective scopes of work.

"Westinghouse will agree to perform its scope of work under a risk-sharing mode of operation, and we will expect the project's other suppliers to follow suit," says Woodson. "The six-year plant will not be achievable unless risk-sharing contracts are followed by all suppliers.

"Since financial rewards are based on performance, only those suppliers whose outstanding efforts keep the project on schedule, within budget and to agreed-upon standards should gain the maximum return. That maximum should be enough of a carrot to keep the rabbit running at full speed toward a six-year plant.

"If the schedule slips, or if any element in the supply organization fails to meet its commitments, the supply organization will have the incentive to remedy the situation."

The risk benefit approach is aimed at meeting schedules and keeping costs to a minimum. Those are, after all, the major concerns of any state public utility commission or financial institution.

"In determining whether or not to finance a new plant, the financial community is primarily concerned with the types of economic, regulatory and political risks involved during the duration of the construction," says Robert G. Hildreth, Jr., Managing Director of Merrill Lynch's Capital Markets Group – the same group that developed the innovative "Newbrook" financial package for the Seabrook plant.

"The utility and its suppliers can help reduce those risks and assure efficient construction by working closely with financial groups during the early design stages of the project. The utility should, at various stages, keep the financial community aware of its plans. That way, financiers can let the utility know, as early as possible, whether or not they feel the construction plan is feasible to justify the necessary financing."

A good plant design – one which is at least 80 percent complete before construction – will not only gain the support of the financial community, but will also assure future cooperation and commitments from the Nuclear Regulatory Commission and the state public utility commission. Plant design should be "frozen" as much as possible. This will reduce, and ideally eliminate, future backfits and rework. The completed design will also help prove to the public utility commission that the utility has taken great preparation to assure efficient construction.

Westinghouse recommends that the utility and its supply organization base the design on a reference plant, then work together to adapt the reference design to the specific site and utility needs.

"The financial community will have a lot more faith that the project will be completed on schedule if we see that the utility is following a reference design," says Hildreth.

Fortunately, the NRC has taken significant steps toward reducing many of the regulatory uncertainties that became so prevalent in the aftermath of Three Mile Island. The Commission has recently approved the long-awaited backfit rule, which will help prevent the implementation of any backfit that does not provide a substantial increase in public safety.

According to Nunzio Palladino, Chairman of the NRC, "During my tenure as chairman, I have sought a new system of backfit controls that would require that a backfit is analyzed and that an explicit judgment of its safety and cost consequences is made. This new rule does just that."

Commissioners Zech and Roberts have stated "... this backfit rule provides a disciplined review ... to assure that there is a rational basis for modifications."

Another note of optimism is the Nuclear Power Plant Licensing and Standardization Act of 1985, a bill which has been drafted by the NRC and submitted to Congress. The goals of the bill are "to provide an accurate, efficient, and more effective licensing process for the design, siting, construction and operation of nuclear power plants."

This bill supports one of the major time-saving elements of the Westinghouse six-year construction plan: one-step licensing. Completeness of design – including the qualification of layouts, systems and components – prior to construction will permit the combined approval of the construction permit and the operating license.

Westinghouse believes that a key ingredient to success is the early identification and resolution of potential risk issues. One objective is the development of a quality assurance program, in which the NRC would follow a "sign as you go" approval process on quality items during construction. This would reduce the potential for any quality assurance issues or last-minute allegations that may arise during the licensing hearing. Westinghouse has discussed this concept with NRC executive management and has found them quite receptive to the idea.

Simplification of plant design is another key way to shorten construction schedules. Working with the NRC and the Westinghouse Owners Group, Westinghouse is identifying and documenting the impact of regulations that have either increased or not reduced risk potential. This process has resulted in decisions reducing the need for snubbers, pipe whip restraints and jet shields.

All of the extensive pre-construction engineering activities necessary to assure complete design and one-step licensing require the most advanced engineering tools. Since the quality and efficiency of the pre-construction activity will be a critical factor, not only in obtaining licensing, but also in acquiring subsequent financial and PUC support, the utility should make every effort to invest in proven technologies which can facilitate engineering and design activities. Westinghouse has developed several such technologies.

Programmed Regulatory Compliance, a computer-based tool, promotes the cost-effective management of regulatory compliance by providing the means to quickly identify design variations, to quickly access and identify regulatory compliance data and to assure the consistency and timeliness of data.

Information on design work and its impact must be immediately available to all key personnel at all times. Westinghouse has developed a software tool which provides "visualization" as well as engineering qualification of all data and design work during all phases of the process. The combination of an extensive engineering database and computer-aided engineering system enables the creation of three-dimensional plant models. These models provide structural layout, equipment location, the design of distributive systems, interface studies and material lists and also facilitate subsequent qualification, cost-estimating, procurement and scheduling activities.

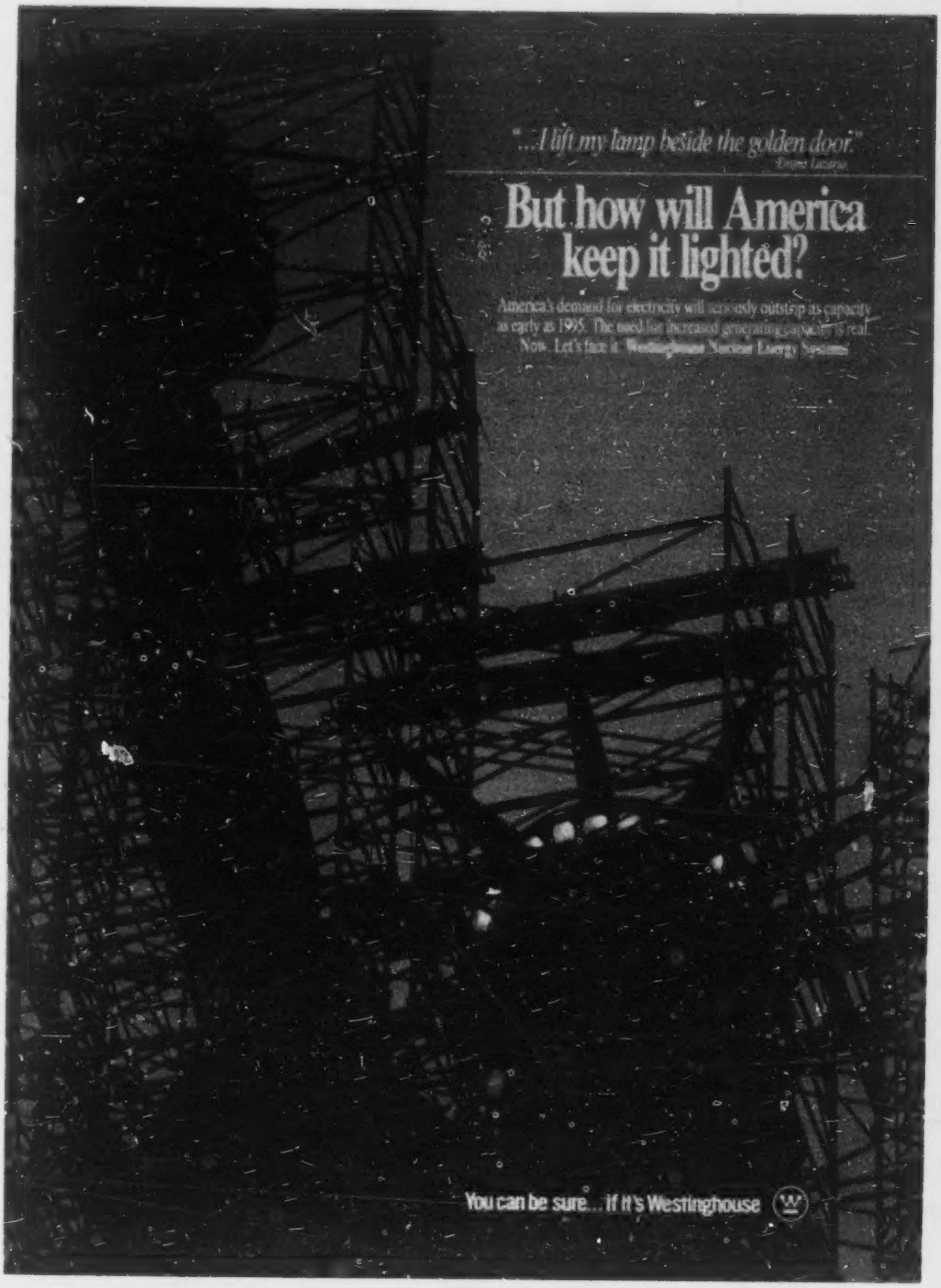
All of these pre-construction activities – design completion, one-step licensing, computer-aided engineering – have a common purpose: to achieve the six-year construction schedule.

When the appropriate level of plant design is completed and the means to achieve it are established, the utility will begin presenting its work to various external decision-makers. Since the supply organization will have worked in close cooperation with financiers and regulators during design development, it will be in an excellent position to assist the utility in acquiring the financial package and construction permit/operating license and to share any related risks. The decision-makers will all want assurance that the six-year schedule will be met. The results of this extensive pre-construction activity should supply that proof.

If, at this point, the public utility commission determines that the plant should not be built, the utility can cancel the project without having made a major investment. However, if there is a confirmed agreement that the plant is needed, if there is a proven methodology for building within the six-year schedule and if there is agreement by all parties to adhere to that methodology, the utility is in a strong position to make the plant a reality. The financial package has been approved, the combined license has been issued and construction can begin.

Westinghouse is confident that the six-year plant can be built in the United States. The need for power exists. The performance of nuclear technology is proven. The industry has learned the value of time and knows that it takes partnership to manage it.

The time for retrospectives and recriminations is over. The time for action is now.



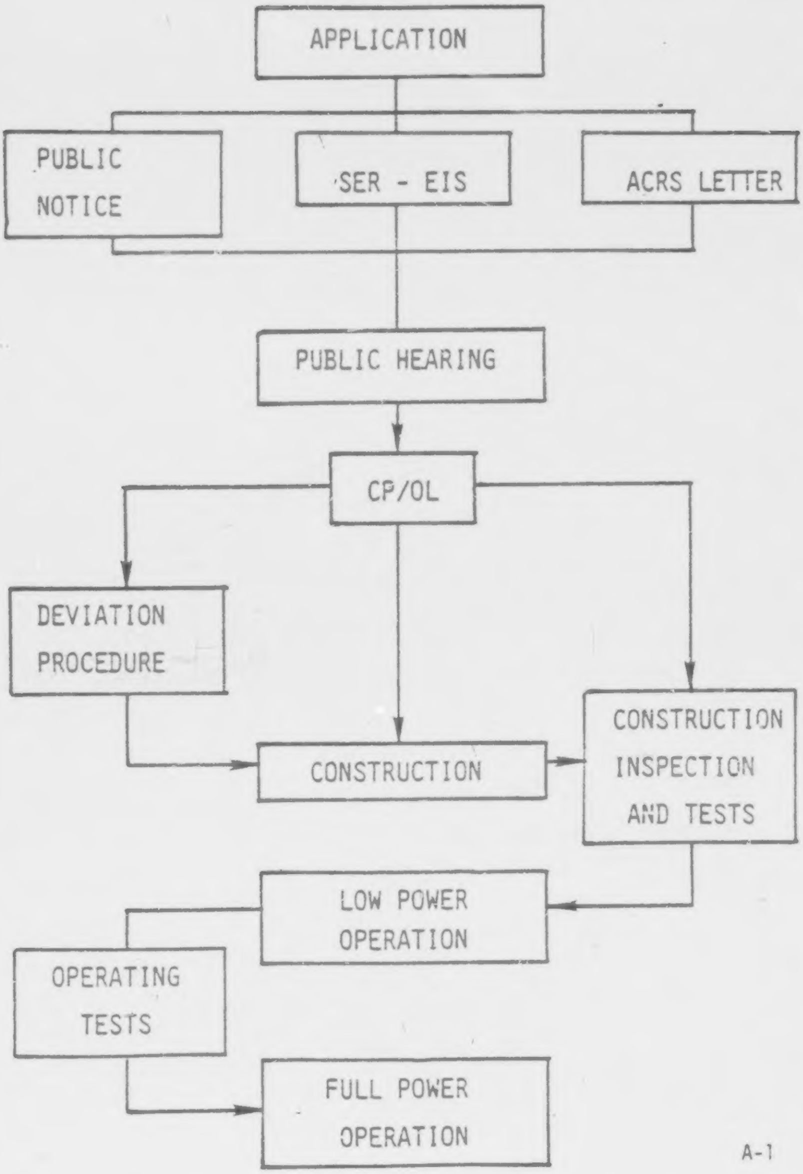
"...I lift my lamp beside the golden door."
Emma Lazarus

But how will America keep it lighted?

America's demand for electricity will seriously outstrip its capacity as early as 1995. The need for increased generating capacity is real. Now. Let's face it. **Westinghouse Nuclear Energy Systems**

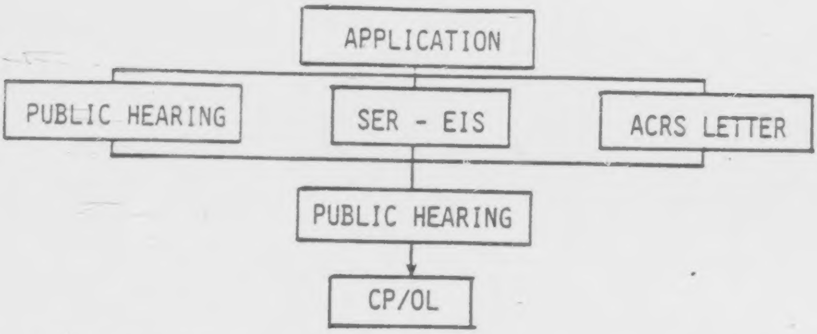
You can be sure... if it's Westinghouse

OVERALL CP/OL PROCESS


APPLICATION
PUBLIC NOTICE
SER - EIS
ACRS LETTER
PUBLIC HEARING
CP/OL
DEVIATION PROCEDURE
CONSTRUCTION
CONSTRUCTION INSPECTION AND TESTS
LOW POWER OPERATION
OPERATING TESTS
FULL POWER OPERATION

A-1

INITIAL LICENSING PHASE



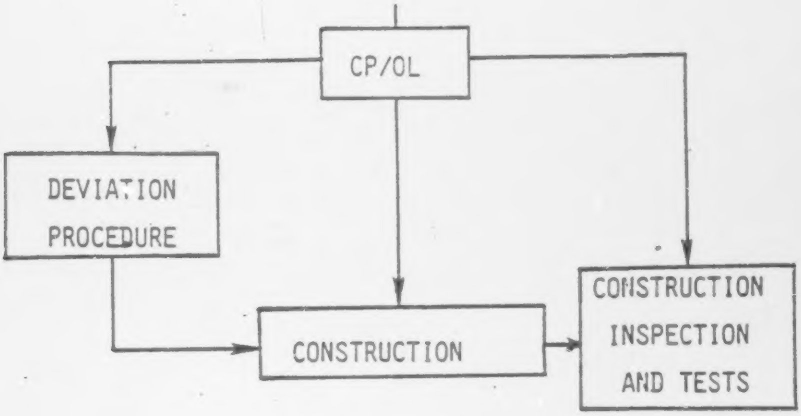
- DEFINE THE DESIGN, EMERGENCY PLAN, MANAGEMENT STRUCTURE ETC. OR DETAILED CRITERIA FOR THOSE ASPECTS WHICH CANNOT BE SUFFICIENTLY DESCRIBED AT THIS STAGE.

- ESTABLISH THE INSPECTION, TESTS AND ANALYSES TO BE PERFORMED TO CONFIRM THAT PLANT AS CONSTRUCTED, THE EMERGENCY PLAN, THE MANAGEMENT STRUCTURE, ETC. CONFORM TO THE TERMS OF THE CONSTRUCTION AND OPERATING LICENSE (HENCE CONFORM TO THE REQUIREMENTS OF THE ACT AND THE COMMISSION'S REGULATIONS)

- FOR EACH INSPECTION, TEST AND ANALYSIS REQUIRED, ESTABLISH THE SPECIFIC ACCEPTANCE CRITERIA TO BE MET TO PROVIDE ASSURANCE OF PROPER CONSTRUCTION, ADEQUATE EMERGENCY PLANS, ADEQUATE MANAGEMENT STRUCTURE ETC.

- THE MATTERS COVERED ABOVE WOULD BE CONSIDERED AT THE CONSTRUCTION AND OPERATING LICENSE HEARING AND WOULD BE INCLUDED IN THE LICENSE (CP/OL)

CONSTRUCTION PHASE


CP/OL
DEVIATION PROCEDURE
CONSTRUCTION
CONSTRUCTION INSPECTION AND TESTS

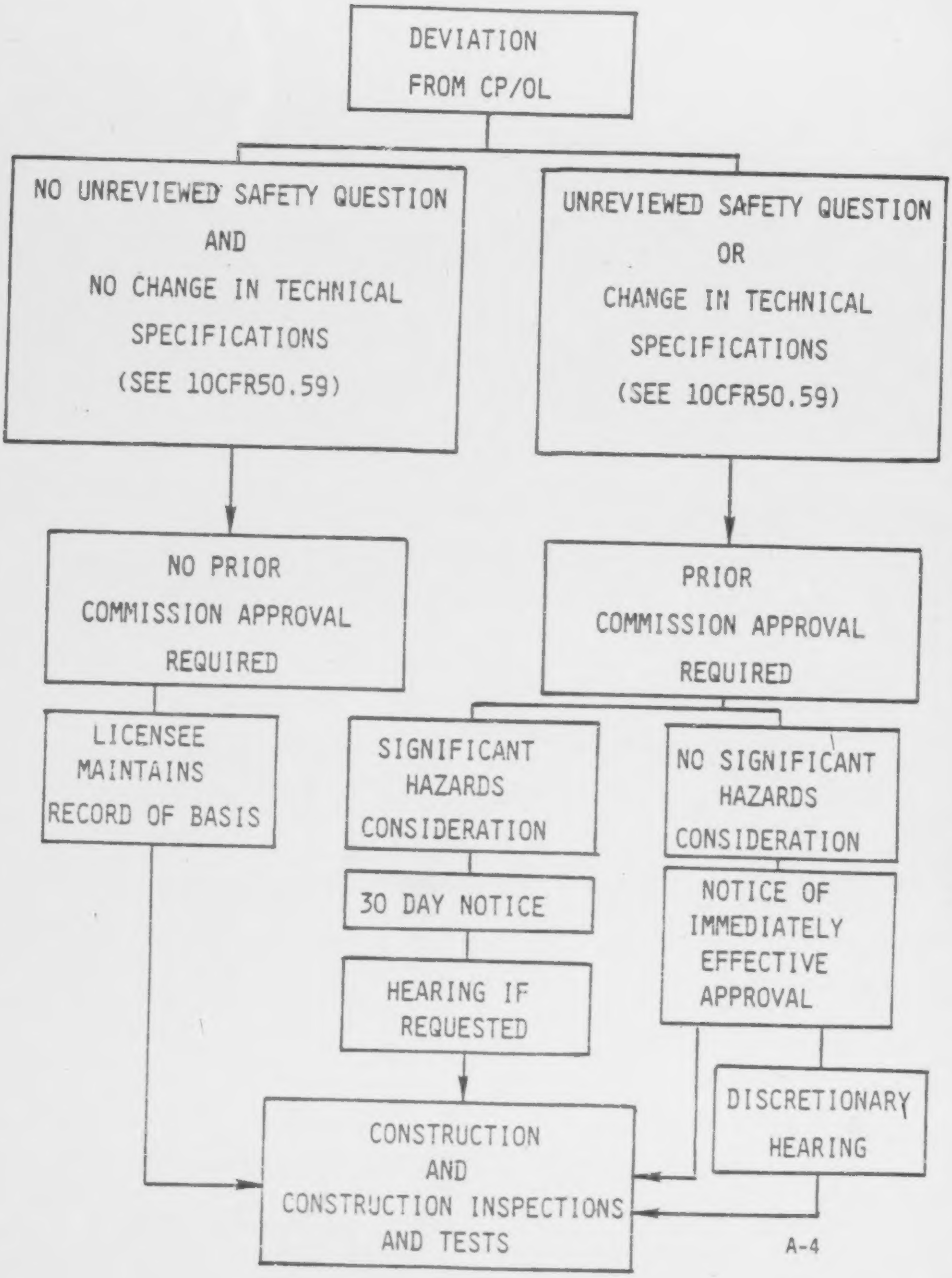
- PACKAGES OF SUPPORTING DATA MAINTAINED AVAILABLE FOR INSPECTION BY THE NRC TO SHOW THAT THE INSPECTIONS, TESTS AND ANALYSES HAVE BEEN PERFORMED AND THAT THE ACCEPTANCE CRITERIA HAVE BEEN MET.

- LICENSEE REVIEWS DEVIATIONS FROM CP/OL. OBTAINS PRIOR COMMISSION APPROVAL IF CHANGE IN TECHNICAL SPECIFICATIONS OR UNREVIEWED SAFETY QUESTION IS INVOLVED (NOTE: THIS TREATS CP/OL IN THE SAME MANNER AS 10CFR50.59 TREATS CHANGES, TESTS OR EXPERIMENTS IN OPERATING PLANTS).

- OPPORTUNITY FOR HEARINGS - THIS WOULD BE GOVERNED BY SHOLLY AMENDMENT TYPE PROCEDURES.

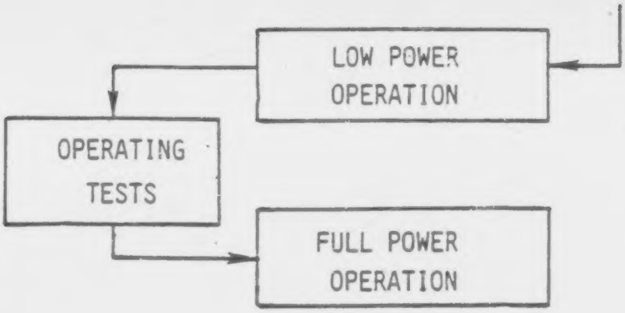
- INSPECTIONS, TESTS AND ACCEPTABLE CRITERIA WOULD BE MODIFIED AND APPROVED IN THIS PROCESS.

DEVIATION PROCEDURE


DEVIATION FROM CP/OL
NO UNREVIEWED SAFETY QUESTION AND NO CHANGE IN TECHNICAL SPECIFICATIONS (SEE 10CFR50.59)
UNREVIEWED SAFETY QUESTION OR CHANGE IN TECHNICAL SPECIFICATIONS (SEE 10CFR50.59)
NO PRIOR COMMISSION APPROVAL REQUIRED
PRIOR COMMISSION APPROVAL REQUIRED
LICENSEE MAINTAINS RECORD OF BASIS
SIGNIFICANT HAZARDS CONSIDERATION
NO SIGNIFICANT HAZARDS CONSIDERATION
30 DAY NOTICE
NOTICE OF IMMEDIATELY EFFECTIVE APPROVAL
HEARING IF REQUESTED
DISCRETIONARY HEARING
CONSTRUCTION AND CONSTRUCTION INSPECTIONS AND TESTS

A-4

OPERATING PHASE


LOW POWER OPERATION
OPERATING TESTS
FULL POWER OPERATION

- LICENSEE CERTIFIES COMPLETION
- INSPECTION AND ENFORCEMENT RESOLVES OPEN ITEMS
- COMMISSION ACTION TO LIMIT OR DELAY OPERATION
  - ON OWN MOTION BASED ON DISCREPANCIES IN INSPECTION AND TEST RESULTS FROM PRE-ESTABLISHED ACCEPTANCE CRITERIA
  - REQUEST FOR ACTION UNDER 10 CFR 2.206

The CHAIRMAN. Thank you, Mr. Moore.
Dr. Wilkins.

STATEMENT OF DR. DANIEL R. WILKINS, GENERAL MANAGER, ADVANCED BOILING WATER REACTOR PROGRAM, GENERAL ELECTRIC CO.

Dr. WILKINS. Thank you, Mr. Chairman. I am Daniel Wilkins, general manager of the Advanced Boiling Water Reactor Program of the General Electric Co.

Prior to assuming my present position I was general manager of General Electric's nuclear power systems engineering department, where I was responsible for design, development and technology support for General Electric's boiling water reactor product lines. This included engineering of 35 boiling water reactors under construction in seven countries throughout the world.

My present position entails responsibility for GE's advanced BWR. The advanced BWR is the result of an international effort to develop the next generation of boiling water reactor. This design achieves major improvements in almost every area of safety, reliability, construction schedule, economy of construction and operation, occupational exposure and radioactive waste volume.

The ABWR is ready for lead plant application in Japan, and GE is currently working with the Electric Power Research Institute to develop the specifications for adapting the advanced BWR to the future needs to U.S. utilities.

The advanced BWR's future, however, and indeed the future of the nuclear option in this country, will be strongly influenced by the answer to the question you are addressing: Will the nuclear licensing process in the United States receive the infusion of stability and predictability which only congressional action can provide? For that reason, I am extremely pleased to be here today to testify for General Electric on S. 2073, the nuclear licensing reform measure under consideration by your committee.

The central problems affecting nuclear power in the United States are not technological but institutional. When Bechtel and General Electric can construct a light water nuclear plant in Taiwan in 5 years and it takes them twice as long to construct the same plant in Mississippi; when the Japanese and the French, using American technology and designs can routinely construct light-water plants on well-defined schedules 40 percent shorter than ours and at substantially lower costs; and when nuclear plants are canceled in New England and arrangements are made to import nuclear generated electricity from Canada, the reasons for our industry's problems are plainly not rooted in the technology itself.

In front of that, the nuclear power technology in use in this country has been proven to be sound. On the whole, the 100 nuclear powerplants now licensed for operation in the United States perform as reliably as coal plants, produce electricity at half the cost of oil plants and competitively with that of coal, and they do so with far less environmental harm than either coal or oil.

The country's continued health and growth will require significant additional electric generating capacity, and there are compelling reasons why a substantial portion of those needs should be met with a safe, environmentally sound source of energy, which nuclear power has proven to be.

In order for that to happen, however, the nuclear plant licensing process must be entangled and transformed into a more orderly and rational process than is now the case. In our view, S. 2073 provides a sound framework for achieving that transformation.

The principal defect in the current regulatory system is the outmoded two-step process by which we license nuclear plants. This two-step licensing machine, which has been critically dubbed the design-as-you-go process, permits the Nuclear Regulatory Commission to authorize construction based upon an incomplete and preliminary design and to defer a final licensing decision until after the design and construction are completed.

The two-step approach has caused serious problems because it postpones many safety decisions until after construction is large complete. It can become necessary to rebuild or replace systems or components. This increases the time required to construct and license plants and escalates costs to utilities and ratepayers. More importantly, by deferring resolution of important safety issues until after a plant is largely completed the two-step process seriously impedes effective NRC safety regulation.

The two-step process, it is worth emphasizing, also hampers effective participation in nuclear licensing decisions. The post-TMI Rogovin Report critically commented that one opportunity for a public hearing on a nuclear powerplant application is held too early to be useful, and the other is too late to be fully effective.

The nuclear licensing process can be sensibly corrected, and S. 2073 contains the essential elements for that task: Provisions authorizing the NRC to grant standardized design approvals, early site approvals and combined construction in operating licenses as well as provisions insuring the stability of the regulatory approvals once given.

In our judgment the keystone to this is design standardization. We believe that standardization offers the single most important contribution that could be made to a more effective licensing and regulatory process and to the assurance of a high level of safety for future nuclear powerplants.

Design standardization will strengthen regulatory predictability, result in sounder application of safety resources, reduce the cost of facility licensing and construction, and improve the effectiveness of public participation.

Preapproval of standardized designs coupled with early site approval would permit the utility to choose a design that had already been approved as safe by the NRC in a site that had been approved as acceptable before committing itself to build and operate a specific plant.

Related safety issues would be resolved on the basis of essentially complete designs before construction begins rather than after the plant is built and awaiting operating authorization.

Single stage licensing of both construction and operation would provide the essential final ingredient.

Upon establishing the compatibilty of the site and the design, the NRC would authorize the utility a single licensing proceeding, both to construct and operate the plant. The NRC would of course perform inspections throughout plant construction, thus verifying that the plant was built in compliance with its licensed authorization.

A statutory framework assuring the stability of approved designs is also essential to the standardization success. The legislation would allow design approvals to be modified only in generic design approval amendment proceedings and permit the NRC to require design change only where the change provides substantial improvement in the overall safety of facility operation that is required to protect the public health and safety.

Congress needs to reform the nuclear licensing process now. We cannot wait until new plants are ordered to begin to plan for design standardization. As much as possible of the designing, planning, and regulatory review should occur before a nuclear plant is ordered. These efforts take years. As the Congress' own Office of Technology stated in its 1981 report on standardization, and I quote, "If standardization is to succeed at all, NRC must start planning for it now during this period of slack growth in nuclear power."

To sum up, General Electric believes the reform of the present NRC licensing and regulatory process is urgently needed, and that such legislation should focus on promoting design standardization, and that S. 2073 provides a sound reform basis and deserves the support of this committee and the Congress.

Thank you, and I would be happy to answer your questions.

[The prepared statement of Dr. Wilkins follows:]

STATEMENT
OF
DANIEL R. WILKINS
GENERAL MANAGER
ADVANCED BOILING WATER REACTOR PROGRAM
GENERAL ELECTRIC COMPANY

BEFORE THE
COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

HEARINGS
ON
S.2073, "THE NUCLEAR FACILITY STANDARDIZATION ACT OF 1986"

April 22, 1986

Mr. Chairman and Members of the Committee:

I am Daniel R. Wilkins, General Manager of the Advanced Boiling Water Reactor Program of the General Electric Company. By professional background and experience, I am a nuclear engineer. I hold a B.S. in Engineering Science from Case Institute of Technology and S.M. and Sc.D in Nuclear Engineering from the Massachusetts Institute of Technology.

Prior to assuming my present position, I was General Manager of General Electric's Nuclear Power Systems Engineering Department, where I was responsible for all design, development and technology support for General Electric's commercial boiling water product lines. This included engineering of 35 boiling water reactors under construction in seven countries throughout the world.

In my twenty years' experience in General Electric's nuclear energy business, I have held previous technical and management positions in direct energy conversion, breeder reactor development, nuclear fuel development, quality assurance and reliability engineering. I am a member of the American Nuclear Society, and am a registered Professional Nuclear Engineer in the State of California.

My present position entails responsibility for General Electric's Advanced Boiling Water Reactor (ABWR) design. The ABWR is the result of an international effort to optimize the design of the Boiling Water Reactor. This design achieves major improvements in almost every important area: safety, reliability, economy of construction, economy of operation (including both fuel cycle and operating and maintenance costs), operating personnel radiation exposures, and volume of radioactive waste generated. The ABWR design is ready for lead project application in Japan, and GE is currently working with EPRI toward the goal of bringing this superior design to U.S. utilities. ABWR's future, and indeed the future of the nuclear option in this country, however, will be strongly influenced by the answer to the question you are addressing: Will the nuclear licensing process in the United States receive the infusion of stability and predictability which only Congressional action can provide?

For that reason, I am extremely pleased to be here today to testify for General Electric on S. 2073, "The Nuclear Facility Standardization Act of 1986," the nuclear licensing reform measure under consideration by the Committee in this watershed year. Nuclear licensing reform is of crucial importance to the future of commercial nuclear power generation and, we firmly believe, to the future well-being of our nation. The country's continued health and growth will require significant additional electrical generating capacity, and there are compelling reasons why a substantial portion of this need should be met by the safe, environmentally sound source of energy which nuclear power has proven itself to be.

In order for that to happen, however, the nuclear plant licensing process must be untangled and transformed into a more orderly and rational process than is now the case. In our view, S. 2073 provides a sound framework for achieving that transformation and merits the affirmative consideration of this Committee and the Congress.

The Need for Nuclear Licensing Reform Legislation

The statutory provisions governing the licensing of commercial nuclear power plants were enacted over 30 years ago in the Atomic Energy Act of 1954. At that time, there was no nuclear power industry, and reactor designs were still in the conceptual and developmental stage. Accordingly, Congress adopted a two-step licensing process -- critically dubbed in later years as the "design-as-you-go" process -- one that permits the Nuclear Regulatory Commission to authorize construction based on an incomplete and preliminary design, and to defer a final licensing decision until after design and facility construction are completed.

The two-step approach may have been a reasonable choice in 1954 -- indeed, it may have been essential to launching the nuclear power program at that time -- but it has caused serious problems. For one thing, because the two-step process postpones many safety decisions until after construction is largely completed, it is often necessary to rebuild or replace systems or components after they have been built or installed. This increases the time required to construct and license plants and substantially escalates their cost to the utilities and their ratepayers. More importantly, as concluded by the President's Commission on the Accident at Three Mile Island (the Kemeny Commission) and the NRC's Special Inquiry Group which investigated the TMI accident (the Rogovin Group), the two-step process, by deferring resolution of many important safety issues until after the plant is largely completed, seriously impedes effective NRC safety regulation. Accordingly, both the Kemeny Commission and the Rogovin Group urged Congress to abolish the two-step process.

The 1954 legislation also hampers effective public participation in the licensing process. Congress, in 1954, did not foresee the emergence of public intervention as a significant element in nuclear licensing proceedings, and experience has shown that the two-step licensing process does not lend itself to timely and effective public participation in those proceedings. The Rogovin report concluded that one opportunity for a public hearing on a nuclear power plant application is held "too early to be useful, and the other is too late to be fully effective."

Plainly, the time has come for basic reform in this process. Two-step licensing was feasible during the 1960's when the technology was evolving, when nuclear power plants were relatively small and inexpensive, and when interest rates were low. As plant sizes, design complexities, capital costs, and interest rates have increased, however, the impact of this piecemeal design and decisional process, and of the post-construction changes which it invites, has become unacceptably severe. As a result, under present regulatory arrangements, no electric utility in this country can be expected to order a new nuclear power plant.

Because of the large reserve margins built up during the 1970's and the decline in electric power demand following the 1973 oil embargo, the nuclear plant cancellations and lack of new power plant orders over the last decade have not resulted in power shortages. That situation, however, can be expected to change, for it is inevitable that this nation will need significant additional electrical generating capacity in the next decade when present reserve margins shrink.

New nuclear power plants can add to the nation's ability to economically meet its electrical power needs in an environmentally sound way. But before the utility industry will be willing to embark on that path once again, Congress must address the fundamental deficiencies in the existing licensing regime and provide a legislative framework that accommodates the present state of technological development.

The Elements of Meaningful Reform

Standardization

The General Electric Company believes that design standardization is the keystone of a sound nuclear power program and of meaningful licensing reform.

By "standard design," we mean a design of either a complete nuclear power plant or a major portion (e.g., nuclear steam supply system or balance-of-plant) that has been pre-approved by the NRC and can be used for multiple units at multiple sites while meeting all NRC safety standards. Such a design -- which could be developed by a nuclear plant supplier, an architect-engineer, or a design team including both -- would be an essentially complete and final design for all parts of the nuclear plant systems important to radiological safety. This is in contrast to the present system and practice whereby reactor vendors, architect-engineers, and utilities waste their technical resources on a variety of custom, single-plant designs. An application for a standardized design approval would contain all of the information necessary for the NRC to determine that a plant using the design will operate safely.

Before a standardized design could be referenced in a specific facility license application, it would have been thoroughly reviewed by the NRC and all nuclear safety issues would have been resolved. Because the standardized design would be intended for use at a number of different sites, the design would be reviewed for application to an envelope of sites with certain parameters, rather than one specific site. The Commission would approve the standardized design only if, after resolving all safety issues and providing an opportunity for a public hearing, it determined that such approval would be consistent with the public health and safety.

Thereafter, a utility electing to use the standardized design would reference it in its license application. The NRC would not repeat the review of design issues previously resolved in the standardized design approval proceeding. In connection with the site-specific facility license application, the NRC would only review those issues relating to the marriage of the standardized design to a particular site, and any other issues not resolved in the prior design approval proceeding or in an early site approval proceeding (discussed below). Members of the public with an affected interest would have an opportunity for a hearing on such issues. Coupled with early site approval, preapproval of standardized designs would permit a utility to choose a design that had already been approved as safe by the NRC and a site that had been approved as acceptable before committing itself to a license application to build and operate a specific nuclear plant.

Single-stage licensing of both construction and operation would provide the essential final ingredient. Upon establishing the compatibility of the site and the design, the NRC would authorize the utility, in a single proceeding, both to construct and -- provided the plant is constructed consistent with the design approval -- operate the plant. The NRC would, of course, perform inspections throughout the construction of the plant, thus verifying that the plant was built in compliance with its license authorization before the plant could begin operation. Since all design and site interface issues would have been resolved in the design approval and single-stage license proceedings, there would be no need for the NRC to review these matters again at the preoperational stage.

An important aspect of design standardization is the centralization of design responsibility for all radiologically significant portions of the nuclear plant. The reactor supplier, either alone or in conjunction with an architect-engineer as a design team, would develop and obtain regulatory approval for the standard design. Such an arrangement would eliminate a number of engineering interfaces which typically create difficulties in both the designing and the licensing review of nuclear plants.

GE believes that standardization offers the single most important contribution that can be made to a more effective licensing and regulatory process and to the assurance of a high level of safety for future nuclear power plants. There are five important reasons why this is so and why standardization deserves to be affirmatively supported by the Congress.

° First, standardization will provide the predictability which is essential to making the multi-billion dollar decision to invest in a nuclear plant;

° Second, standardization will lead to a better allocation of industry and regulatory safety resources;

° Third, standardization will improve the quality of NRC licensing and regulatory decisions;

° Fourth, standardization will substantially reduce the costs of constructing and licensing new nuclear units; and

° Fifth, the pre-approval process, which is an integral aspect of standardization, will enhance both the timeliness and effectiveness of public participation in the licensing process.

It is worth examining each of these benefits in more detail:

Predictability. Even if they wanted and needed to order a nuclear plant, utilities today would not do so because of the inability to predict when the plant could be available and at what cost. The removal of the design review from the critical path and the resolution of safety issues prior to selection of a nuclear plant greatly reduce the uncertainty associated with eventual plant operation. In addition to reducing the utility's risks associated with construction of the plant, this predictability should assist in receiving public utility commission approval of additional generating capacity and improve the ability to obtain needed financing at reasonable rates. Standardization, as proposed in the legislative measure before this Committee, should provide a significant contribution to resolving the major uncertainties associated with nuclear plants -- cost control, regulatory predictability, public utility commission support and financial community confidence.

Increased Assurance of Safety. Standardization will make an important contribution to the safety of nuclear power plants in several ways:

- It will result in suppliers and architect-engineers devoting greater resources to a given design. Similarly, it will decrease the number of different reactor designs that NRC will have to review, understand, and regulate. In short, it will optimize the allocation of safety resources within industry and government.

- Standardization will also increase the applicability of operational experience as well as industry and NRC awareness of that experience. With fewer design differences between plants, operating events will be easier to understand and the relevance of an event at one reactor to other reactors will be more obvious.

- Further, design standardization will facilitate resolution of many generic safety issues by reducing the number of designs that the industry and the NRC must investigate with respect to generic safety-related problems.

- And, finally, design standardization will enhance quality assurance by reducing the total number of different systems and components that must be designed, manufactured, installed, maintained, and inspected.

Better Regulation. Closely related to this contribution to safety is the improvement in the quality and efficiency of NRC regulation that will result from standardization. Standardization will decrease the number of different designs that the NRC will have to review, understand, and regulate. Similarly, standardized final designs that have been preapproved for multiple future use will eliminate the need for repetitive *ad hoc* design reviews in individual plant proceedings. Moreover, standardization, coupled with single-stage licensing prior to the beginning of plant construction, will enable the NRC to resolve all safety questions *before* construction begins -- rather than after the plant has been built.

In short, standardization will enable the NRC to focus its regulatory resources with greater intensity on fewer designs and in fewer review proceedings, allowing it to concentrate on the more important safety questions, and at the time when it makes the most sense to do so.

Reduced Costs. Further, standardization will reduce the cost of constructing a nuclear power plant. By taking the design review off the critical path of the licensing process and by settling on an essentially final design before construction begins, standardization can reduce the time it takes to license and construct plants by several years, saving hundreds of millions of dollars in capital and interest costs.

Moreover, standardization will enable the NRC to conduct complete, thorough safety reviews before major construction is initiated. The constant changing of the design under the present two-step process is a major reason for the cost increases and delays currently experienced by nuclear projects, as well as for the need for NRC to require design changes or "backfits" after construction begins. Standardization permits final resolution of all design safety issues before construction begins, giving a utility confidence that all licensing requirements are understood and can be met before it commits itself to the design.

Improved Public Participation. In addition, design standardization will permit more effective public participation by affording the affected public an opportunity to have its questions considered earlier in the process -- prior to any major utility commitment to a plant employing the design. Moreover, the public would be better informed because the hearing would be held with respect to an essentially complete design, which would provide a greater information base.

The Need for a Secure Legislative Framework

For the reasons enumerated above, GE believes that standardization not only offers realistic, workable solutions to many of the problems confronting the industry, but that it would contribute substantially to the protection of the public health and safety. GE is by no means alone in its recognition of the merits of standardization. NRC's Special Inquiry Group -- the Rogovin Group -- strongly recommended that the NRC encourage the use of standard designs, concluding that standardization would "in the long run, substantially improve plant safety and reliability." More recently, the Congress' own Office of Technology Assessment has given its support to design standardization.

Our nuclear regulators -- the NRC, and the AEC before it -- have also recognized the importance of standardized designs, and have encouraged their development and industrial acceptance since 1973. And the major reactor vendors have, in fact, been developing standardized designs. GE is a leader in this effort and in 1983 obtained the first final standardized design approval ever granted by the NRC.

General Electric is involved in the EPRI Advanced Light Water Reactor Requirements Program. General Electric is utilizing its Advanced Boiling Water Reactor (ABWR) in this program in order to insure that the utilities' improved performance requirements for future LWRs can be attained by the next generation of designs. In parallel, we are pursuing the licensing of this design with DOE and NRC. We believe these initiatives can contribute materially to the goal of revitalizing the nuclear option in the United States, and help avoid watching the nuclear leadership role slip from the U.S. grasp. Key to the success of this effort, however, is the need for prompt, positive action by Congress to reform the nuclear licensing process in this country.

An illuminating lesson in the frustration and waste of resources entailed in attempting to obtain regulatory approval of any design, even a standardized one, under the present, undisciplined process, is provided by our own experience with GESSAR II. Our attempt to obtain approval of our improved and standardized BWR/6 design commenced in 1973. After 13 years and tens of millions of dollars invested, we still have not reached the end of the process; in fact, NRC's Advisory Committee on Reactor Safeguards, in its recent technical review of GESSAR, has proposed major changes beyond existing regulations, and has cited major disagreement with NRC standardization and severe accident policies.

And so it goes -- the present unwieldy process may yet, even after 13 years of effort, thwart the ultimate usability of this excellent design. Thus, this Committee can see why we believe that for standardization to become a commercial reality it should be integrated into an overall licensing process which effectively supports this design approach.

An effective process, it should be emphasized, must rest on a secure legislative framework which not only governs the approval of standardized designs but also assures stability of approvals once granted; that is, the process must deal sensibly and predictably with the treatment of those approvals in subsequent licensing proceedings. Accordingly, we believe two statutory provisions are essential -- one authorizing the NRC to issue a combined construction and operating license for standard designs (so-called "single-stage licensing"), and another ensuring the stability of regulatory approvals once granted.

Single-Stage Licensing. If standardization is to succeed, one of the central precepts of reform legislation must be that all major issues relating to the design, siting, and operation of a nuclear power plant are to be reviewed and resolved, with an opportunity for a hearing, prior to issuance of a combined construction and operating license. So long as licensees remain subject to a second design review proceeding after a plant has been constructed, neither vendors nor utilities will see any advantage to committing themselves to the heavy front-end investment required by standardization. Moreover, as a nation, we should no longer tolerate a system that permits a utility to invest billions of dollars building a plant before resolution of such fundamental issues as whether the design will operate safely or whether emergency planning is feasible. We believe that, through standardization and single-stage licensing, all major issues can and should be reviewed and resolved prior to construction authorization, based on sound functional criteria.

Issuance of a combined construction and operating license at the outset would not mean that the public would have no further assurance that the plant, when completed, will operate safely. To the contrary, the legislation should require the NRC, when granting the combined construction and operating license, to specify the inspections, tests, analyses, and acceptance criteria that it will employ throughout the construction and preoperational testing phases to ensure that the plant is constructed in conformance with the license and will operate safely. In addition, while a public hearing should not be held as a matter of course at the preoperational stage, the legislation should provide an opportunity for a hearing on issues that were not and could not have been heard at the hearing on the combined construction and operating license, or where a showing has been made that the plant, as built, does not comply with its license. And, of course, the NRC would always have the power to institute a hearing and to modify, suspend, or revoke a combined construction and operating license where necessary to protect the public health and safety.

Stability of Regulatory Approvals. A statutory framework assuring regulatory stability of an approved design is also essential to standardization's success. Regulatory changes should not be permitted absent clear justification, measured against well-defined and systematically applied criteria. A standardized design would be standard in name only if the design were subject to change in every individual licensing proceeding in which the design is employed. Accordingly, the legislation should permit design approvals to be modified only in generic design approval amendment proceedings in which the vendor responsible for the design is a party -- not in individual reactor licensing proceedings applicable only to one licensee. Moreover, the legislation should permit the NRC to require changes to the design only where the change provides a substantial improvement in the overall safety of facility operation that is required to protect the public health and safety.

We would emphasize that this proposal would not preclude necessary changes or diminish the level of safety protection afforded. One of the fundamental principles of standardization is that all significant safety aspects of the plant design be thoroughly considered before the design approval is granted. Thereafter, no change should be made to that design which could, either directly or indirectly through system interactions, reduce the overall safety of the facility. Accordingly, no change should be made unless the need for, and effects of, that change have been carefully considered. Far from placing an arbitrary "lid" on design changes, this proposal would actually enhance plant safety by requiring the NRC to carefully evaluate the safety effects of any proposed design change before its implementation.

Early Site Approvals. Another important element of an effective licensing framework is legislative authority to approve a nuclear power plant site before an application is filed to build a specific facility on the site. Early site approval authority is an important complement to standard design approval authority. Early site approvals also would enhance public participation by providing a hearing opportunity on the use of a site prior to a utility applying for a license to construct a nuclear facility at the site or making a significant financial commitment to the site's use. In addition, early site approvals would remove site reviews from the critical path of nuclear power plant licensing, thereby reducing costly delays and adding greater certainty to the nuclear plant planning schedule.

The Importance of Congressional Action At This Time

S.2073, "The Nuclear Facility Standardization Act of 1986," contains provisions for all of the foregoing essential elements: standardized design approvals; early site approvals; single-stage licensing; and regulatory stability. It provides, in our view, a sound framework for this Committee's consideration of nuclear licensing reform and for ensuing legislative action by the Congress.

Congress needs to reform the nuclear licensing process now, even though no new nuclear plant orders are visible on the planning horizon. One of the fundamental features of the proposed licensing process is that as much as possible of the designing, planning, and regulatory review effort would occur before nuclear plants are ordered. These efforts take years; we cannot wait until new plants are ordered to begin to plan for design standardization. As the Congress' own Office of Technology Assessment stated in its 1981 report on standardization, "[i]f standardization is to succeed at all, NRC must start planning for it now during this period of slack growth in nuclear power."

Moreover, without passage of an effective reform measure, we believe that we will see a continuing decline in the invaluable national asset embodied in the technical resources of the nuclear industry. The consequence will be serious, adverse impacts in three major areas: reduced availability of needed technical personnel; loss of vital suppliers; and migration of major technical resources to other nations.

Conclusion

To sum up, General Electric believes that legislation to reform the present NRC licensing and regulatory process is urgently needed. Such legislation should focus on promoting design standardization. To provide a workable framework to encourage and accommodate standardization, the legislation must authorize single-stage licensing and ensure the stability of designs once approved by providing firm standards governing their modification. We believe that the provisions of S.2073 provide such a framework and constitute a sound basis for this Committee's consideration of meaningful reform legislation.

The CHAIRMAN. Thank you very much. Each of you gentlemen has talked at one time or another about standardized design. What is a standardized design? How much of a nuclear plant can be standardized? Mr. Smith?

Mr. SMITH. Senator, that could be either the complete plant, it could be the nuclear steam supply system, it could be the balance of the plant. We think that the legislation itself need not seek to be definitive with respect to that, but the legislation is better drafted as it is to provide considerable flexibility for the Nuclear Regulatory Commission which must then implement the legislation with appropriate regulations.

The CHAIRMAN. Dr. Brewer?

Dr. BREWER. A standardized design, Senator, is a design of a complete plant or a subsystem which can be moved from site to site, from utility to utility in a preapproved fashion.

The CHAIRMAN. How much of a plant can be standardized under that definition?

Dr. BREWER. I think essentially all of the nuclear steam supply systems should be standardized, and to whatever detail is required for a safety review, and I have heard testimony today and previously that about 90 percent of the balance of the plant can be standardized the remaining 10 percent, depending on site-specific phenomena.

The CHAIRMAN. You believe that is achievable?

Dr. BREWER. Yes, sir.

The CHAIRMAN. Mr. Moore?

Mr. MOORE. I think Dr. Brewer has put it very well. I would agree with his statement completely.

The CHAIRMAN. Dr. Wilkins.

Dr. WILKINS. I agree completely.

The CHAIRMAN. Mr. Smith, the nuclear industry has taken steps to further the safety of plant operations through the Institute of Nuclear Power Operations and the National Academy of Nuclear Training. What are some of the tangible evidences that such self-regulatory efforts are working, providing the improvement of plant operation?

Mr. SMITH. Some of the tangible evidences are, I would say, manifold throughout the industry. The Institute of Nuclear Power Operations has developed a set of performance indices by which the plants themselves are measured with respect to their performance, their compliance, of course, with Nuclear Regulatory Commission safety requirements. If one looks, for example, at the number of four scrams or unplanned adages which have occurred, one sees a dramatic decrease as the result largely, I would submit, of the collective approach by the industry through the Institute of Nuclear Power Operations.

One sees significant commitments to training at all of the facilities around the country, and as I mentioned in my testimony, the National Academy of Training has been established, and it is a requirement of all nuclear licensees that all of their training programs be accredited by the Institute of Nuclear Power Operations at the end of this year, and I think that will in itself lead to a substantial assurance to the licensees themselves, the industry, and the entire public of attainment of excellence in operations.

The CHAIRMAN. It has been suggested by a number of witnesses and other persons outside of this hearing that to achieve what we are really attempting to achieve here, we can't just look at plant design. We have to also look at plant operation. Are there lessons to be learned from our recent experience in the training and certification of operators that can be applied or needs to be applied in terms of the legislative provisions which may be enacted?

Mr. SMITH. Yes; I think in terms of the need for this legislation the experience which is occurring around the country does support the need for legislation. The Institute of Nuclear Power Operations through its audit of all facilities is a repository not only for the operator skills and management skills that need to be applied, but it is a repository for a significant amount of information on equipment performance and system performance, and I believe that through the institute that the industry is collecting and does have available a large amount of very valuable data that will be of great assistance in the licensing of standardized facilities.

The CHAIRMAN. I am sure combustion engineering would like to answer this question, but I am going to direct it to someone else. And I have a specific reason to do that. Mr. Smith, combustion engineering has the only standardized plant design available in the United States. If there is no legislative change in the licensing and operating procedures, would a utility be willing to order CE's standardized design in today's licensing climate?

Mr. SMITH. Well, unfortuntely, Mr. Chairman, in today's licensing climate I am afraid that a utility would find that it was not economical and not wise to order such a system from combustion engineering, however desirable that might be, if we are able to achieve some regulatory stability through this licensing.

I think that if we are able to achieve regulatory stability and certainty and predictability through the enactment of this legislation and its proper implementation by the NRC, then one would see that not only was the combustion engineering nuclear steam supply system much more attractive to utility operators, but the GESSAR system would be attractive. Replication of some standardized designs that are already extant would be much more attractive to industry.

The CHAIRMAN. I am going to turn that around. I am sure you, Mr. Smith, would like to answer this next question, but I am not going to ask it of you. I want to ask it of the vendors in particular, and I asked the question of the earlier panel about the transfer of responsibility early in the process and earlier in the history of nuclear power in this country. Vendors had substantial responsibility. A lot of the burden was on the vendors, and in recent years nearly all of that burden has been transferred to utilities.

Now, first of all, do you agree with that statement, and second, if you do, do you believe, or if you don't, I guess, do you believe that the current legislation before us appropriately affects the assignment of responsibilities? Let us start with you, Dr. Brewer.

Dr. BREWER. I think it does, Mr. Chairman. First of all, I agree that the responsibility has shifted in terms of scope of a nuclear powerplant. The NSSS system has become less and less of the dollar capital costs over the years, so your first statement certainly is true. I think the proposed legislation would appropriately assign to the reactor vendors who have the technical resources and who are expert in this field to gain the preapproved license, and that is appropriate so that when the utilities enter the picture they have a preapproved design which is licenseable and can marry that with the site and can get on with the construction.

Mr. MOORE. To clarify your question a little bit, Senator, in the early days the supplier took on what we used to call turnkey responsibility where we had the burden of—the whole construction of the plant was on the supplier. That evolved the way the utilities have taken on that construction burden. However, internationally we still take the 'burden for full construction on a turnkey basis. We can do that because we have preengineer, prelicense designs, and so we know what we are going to build, and there is certainty in that process.

So, this legislation will allow us as an industry to assign that risk. It may be a shared risk in whatever form, but there is certainty now where we all understand what it is we are going to build and we can apportion that risk in whatever way is appropriate to the particular supplier or utility, but the legislation allows us then to do that in a way where we each understand what we are picking up and how we are going to execute the project and take our proper share of that.

The CHAIRMAN. Dr. Wilkins.

Dr. WILKINS. I agree. I think that the S. 2073 bill leads to a much more logical allocation of responsibility than we currently have. The expertise of the vendors is in the areas of design, and they are the logical holders of the design and the design certification. The expertise of utilities is in the area of siting, operation, maintenance, and the bill would logically place those responsibilities with the utilities, and I think that is clearly better than the present arrangement.

The CHAIRMAN. Dr. Brewer, you have heard references made to the advantages of the Palo Verde site, and simply replicating the plants. Is that, under a current law, the same advantage available to a different entity at a different site?

Dr. BREWER. Mr. Chairman, the advantages that Mr. Turley alluded to are there and real. For example, unit 2 was about 12 percent less in capital costs than unit 1, and unit 3 was about 29 percent less in capital costs than unit 1, reflecting a learning curve. However, much more could have been achieved had, instead of having a final design approval, which we have for our standard unit, if we had had a preapproved design license, this would have enormously reduced the cost to Arizona.

The CHAIRMAN. Combustion engineering has what the NRC calls a final design approval for the system 80 nuclear steam supply system. Is there a practical difference between a final design approval and the standardized design license called for in S. 2073?

Dr. BREWER. Yes, sir, there is a massive practical difference, distinction. A final design approval is not a license. It is a review, an opinion, a checkoff by NRC staff, and it is quite helpful. It reduces the licensing time in future plants, but it is not a license. It is not a Commission document. The design license, however, called for by the legislation is a license. It has legal bearing.

The CHAIRMAN. Does the NRC now require the licensee to provide inspection by designated quality assurance inspectors during construction, Mr. Moore?

Mr. MOORE. No, they do not. The suggestion of designated inpectors is an idea, a program that has worked successfully in other industries. The FAA is one specifically that uses that. The concept is to use acknowledged experts to do more detailed quality checks, and reviews of specific parts of the project as the construction proceeds to give us another level of detailed assurance that everything is being done in accordance with the license that will support, then, the NRC's review, which is essentially at the systems level.

The whole idea of the concept is just another way of trying to avoid surprises. The whole concept was, we do not want surprises at the end of the job, and this is the mechanism to do that.

The CHAIRMAN. Are there others of you who would like to comment on that?

Mr. SMITH. Yes, Mr. Chairman, if I may. The advantages of such a system, I think, have been summarized by Mr. Moore. I think one has to keep in mind that there are also possible disadvantages to such a system, because you do provide a system of incentives on the part of those during the inspection to continue to do their work at some length, and the situation in which TVA now finds itself at Watts Bar with its outside quality inspection team is a very unfortunate situation, and I think that if outside independent experts are used in the process, they should only be used with a very disciplined process which would avoid the problems that have taken place at TVA's Watts Bar plant.

The CHAIRMAN. I will ask both you, Mr. Moore, and you, Dr. Wilkins, to provide for the record the status of your efforts to develop a standardized reactor design in your companies, but I would ask you now, is there any incentive to pursue the preapproval of such designs under current NRC licensing standards, and if there is or is not, how does the passage of legislation such as that which is before us give you incentive or more incentive for preapproval of standardized designs? Mr. Moore.

Mr. MOORE. Well, I think as we stated before there is not a lot of incentive today to put a lot of up front money, investment, and significant millions of dollars, hundreds of millions of dollars in a preapproved or preengineered design. To go through a process where you are still at the mercies of the two-step hearing process, and even with back-fit protection, which does exist now under the NRC's rules, that is not founded in legislation, and so that is subject to the vagaries of future Commissioners or what have you.

So, when you look at making that up-front investment as a supplier, it really becomes a question of the incentives are not really there because the certainty is not there. Now, the legislation puts a mechanism in place that allows us to work together with the NRC and do the preengineering and do the prelicensing, and then we get the license, as Dr. Brewer explained, the design certification, and now we have something in hand that we know has some certainty to it, founded on a statutory basis.

The CHAIRMAN. Dr. Wilkins?

Dr. WILKINS. Mr. Chairman, it might be helpful if I provided a few comments on our experience in that area. When the AEC back in 1973 announced its standardization policy, we submitted our General Electric standard safety analysis report, which at the time was rather unique. It was a complete design encompassing 100 percent of the safety information, and it was engineered for a site envelope covering 80 percent of the U.S. sites, and quickly after that six plants referenced the design, and a number of the utilities referenced portions of the design.

It is now 13 years later, and we look back at that effort, and we were successful in one sense. We received the first final design approval from the NRC, and a number of plants have gone into operation, taking advantage of the GESSAR program. Where we were not successful is in getting an approval for future construction, which would take advantage of the standard design for future plants. We are continuing to seek that approval. We are not there yet. We are not clear when and if we are going to get there.

The CHAIRMAN. How long have you been trying?

Dr. WILKINS. It has been 13 years.

The CHAIRMAN. Do not give up hope. [General laughter.]

Dr. WILKINS. The present process is simply not geared to approving standard plants for future construction. We have tried. The NRC staff has tried. But our view after this 13 years is that we must have a national mandate for standardization to make it work.

The CHAIRMAN. Dr. Wilkins, I think that recitation of the facts that you have been for 13 years trying proves two things. One is, you are darn stubborn, and the other is, you do not have any alternative, or maybe a combination of both. Perhaps we ought to help relieve you in that regard, and that is the purpose of this hearing and the purpose of this legislation.

I have the responsibility of chairing a hearing in the Appropriations Committee which starts at 2 o'clock. I will turn the gavel over to Senator Evans to conclude this panel, and to hear the remaining panel. Thank you very much, Senator, for being willing to accept that responsibility.

Senator EVANS [presiding]. Thank you, Mr. Chairman. Unfortunately, I did not have the opportunity to hear the presentations. I think it might be both premature and illogical for me to get into a series of questions with all of you. I think that perhaps I will have some written questions which I may want to submit a little later after I have had a chance to get some briefing on the testimony and the discussions which went on here. Other than that, in fact, maybe I will ask one question, because I have asked it of everybody else this morning, and from your perspective it would be interesting, and that question was, would we be better off to have a nuclear regulatory agency headed by a single person in the same nature that the Enviromental Protection Agency is? Or do you feel that there would be any advantage in that vis-a-vis a commission?

Mr. SMITH. Senator, if I may answer, I would say in my opinion absolutely. The country would be well advanced and better off to have a single administrator. I believe the four Commissioners who are here this morning answered that question in the affirmative, and I think many of the outside studies that have been done of the Commission have come to the same conclusion. The Edison Electric Institute, the Atomic Industrial Forum, and the American Nuclear Energy Council have all supported that view.

Senator **Evans**. Any other comments?

Dr. **Brewer**. I agree.

Mr. **Moore**. I agree.

Dr. **Wilkins**. I agree.

Senator **Evans**. Someplace along the line I am going to find somebody who does not agree. We will find out why it is so difficult to achieve. Also, in the nature of the same question I asked this morning, I do not know from any of your perspectives to what degree you have looked at this, but in the development of our Pacific Northwest power plan, we attempted to devise a system of what we call options, a chance to try to go through the extensive time period required for an environmental design and other considerations to take you up to the start of construction, recognizing that that usually, regardless of the kind of plant you are involved with, whether it is nuclear, coal, or most anything else that uses up a substantial percentage of the current amount of time it takes to do a plant, and not very much of the money, relatively, and at that point we believe that it might be useful to be ready for construction and then have the authority to delay construction until such time as there was a clearer need for power recognized, and then we could react to that rapidly by knowing that you would only have the actual construction time required to have a plant on line.

I guess the fundamental question, is that a useful process, and if it is, what would be a maximum length of time that you think might be feasible and desirable to put something on the shelf between the time it was ready for construction and the time that you would be allowed to go ahead and construct.

Mr. **Moore**. If I could take a crack at that, in fact, I have an addendum to my testimony which goes through essentially that kind of process where you do all of the up front effort on the design certification so the NRC piece is complete, and you work with the PUC's and the need for power. All of that is defined up ahead of time at a lot less investment than actually starting the construction, and I think that is the process that is going to have to be in place before one really starts to commit the billions of dollars in the construction. How long that has to stay on the shelf, there was some discussion earlier from the NRC standpoint, and I think that their view was, and I would subscribe to it, is, it is consistent with the design certification and the early site approval, which has a 10-year subject to renewal kind of a basis.

I think the fluidity, and I am not clear in my own mind if it would be back to the State level, at what point they would be willing to live with their assumptions and what had to be done on the part of their regulating process. I think that the concept is clearly viable, and one that probably we will be using.

Dr. **Brewer**. I think, Senator, that the central essence of the proposed legislation is that we make all of the societal decisions up front before we commit large quantities of money during the construction cycle. And your model certainly fits that legislation, and 10 years for preapproved design, 10 years for preapproved site.

Mr. **Moore**. We would certainly hope you would build one before that, though.

Senator **Evans**. Thank you very much, gentlemen.

We will call now on panel No. 3, Mr. Richard Siebert, vice president, resources and technology department, National Association of Manufacturers; Mr. Michael Faden, legislative counsel, Union of Concerned Scientists; and Dr. John Anderson, executive director of the Electricity Consumers Resource Council.

I understand the Chamber of Commerce of the United States has written testimony, which we will make a part of the record.

[The prepared statement of Ms. Connolly follows:]

Statement
# of the
Chamber of Commerce
# of the
United States

ON: THE NEED FOR ENACTMENT OF NUCLEAR POWER PLANT LICENSING AND STANDARDIZATION LEGISLATION

TO: SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

BY: SUSAN L. CONNOLLY

DATE: APRIL 22, 1986

The Chamber's mission is to advance human progress through an economic,
political and social system based on individual freedom,
incentive, initiative, opportunity and responsibility.

The Chamber of Commerce of the United States is the world's largest federation of business companies and associations and is the principal spokesman for the American business community. It represents approximately 180,000 businesses plus several thousand organizations, such as local/state chambers of commerce and trade/professional associations.

More than 91 percent of the Chamber's members are small business firms with fewer than 100 employees, 57 percent with fewer than 10 employees. Yet, virtually all of the nation's largest companies are also active members. We are particularly cognizant of the problems of smaller businesses, as well as issues facing the business community at large.

Besides representing a cross section of the American business community in terms of number of employees, the Chamber represents a wide management spectrum by type of business and location. Each major classification of American business--manufacturing, retailing, services, construction, wholesaling, and finance--numbers more than 12,000 members. Yet no one group constitutes as much as 29 percent of the total membership. Further, the Chamber has substantial membership in all 50 states.

The Chamber's international reach is substantial as well. It believes that global interdependence provides an opportunity, not a threat. In addition to the 56 American Chambers of Commerce Abroad, an increasing number of members are engaged in the export and import of both goods and services and have ongoing investment activities. The Chamber favors strengthened international competitiveness and opposes artificial U.S. and foreign barriers to international business.

Positions on national issues are developed by a cross section of its members serving on committees, subcommittees and task forces. Currently, some 1,800 business people participate in this process.

STATEMENT
on
THE NEED FOR ENACTMENT OF NUCLEAR POWER PLANT LICENSING AND STANDARDIZATION LEGISLATION
for submission to the
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
by
Susan L. Connolly*

April 22, 1986

The U.S. Chamber of Commerce is pleased to have the opportunity to comment as the Committee considers proposals on nuclear licensing and regulatory reform and express our support for S. 2073, the "Nuclear Facility Standardization Act of 1986."

While forecasts differ in their quantitative aspects, most energy experts predict that the country's continued health and growth will require additional electrical generating capacity, in addition to improving energy conservation and efficiency. Significant additional capacity may be needed in some regions. Realistically, coal and uranium represent the only two fuels available to meet the bulk of our future electrical needs. Regardless of the price of oil, it will be used first to meet liquid fuel requirements of transportation.

Over the more than 25 years of experience of the private sector in designing, building, and operating nuclear plants, a broad consensus has formed that the Nuclear Regulatory Commission's (NRC) regulatory requirements have been unstable and unpredictable and have contributed substantially to utility managers' recent decisions essentially not to use this important energy source.

---

*Manager, Energy and Natural Resources Policy

More than 100 nuclear power plants have been canceled since 1972. In 1984, nine reactors worth more than $10 billion, on which substantial work had been completed, were abandoned. There are many reasons for these cancellations, some complex and unclear, and for the lack of orders for new plants since 1978. However, a compelling reason, one that is the subject of this statement, is the antiquated framework under which the NRC regulates the nuclear industry.

The Congress now has the opportunity to modernize this framework to reflect current informed engineering consensus and to learn from U.S. experiences over the past 25 years and experiences of other countries. Our doing so will help to preserve the nuclear option. Modernization and even substantial changes in present licensing and regulatory processes can be consistent with high-level safety standards. Change does not mean that nuclear power is to be chosen above all others but rather that it is to be given a fair chance when a choice must be made.

In order to accomplish all of this, we urge the Committee to report nuclear power plant licensing and standardization legislation based on the following principles:

(1) pre-approval of standardized plant designs;
(2) early site approval;
(3) a combined construction and operating license; and
(4) regulatory stability.

The principles form the framework of S. 2073. We urge its prompt adoption.

THE NEED FOR REFORM

From 1983 to 1985, electricity demand increased nine percent, a larger increase than at any time since the 1973 Arab oil embargo. Some high-growth forecasters predict that a shortage of electricity is possible in the near future, with demand beginning to exhaust supplies between 1988 and 1990. They predict increasing electricity prices beginning around 1990 and limited and/or restricted electricity supplies hindering economic development shortly thereafter. Other forecasters predict this scenario five to 15 years later, but this is a short time when it takes fifteen or so years to plan, site, and build any kind of plant.

The Chamber has no basis to choose one growth forecast over another. Nonetheless, the implications of these forecasts are troublesome. Not only does bringing a new plant on-line require a long time, but also under the present nuclear power plant licensing framework no new plants have been ordered since 1978; all those ordered since 1974, with the exception of two, have been cancelled; and many other plans for new plants have been shelved. Equally troublesome is that the time required to build and license a nuclear power plant is double that of a decade ago and more than double that for plants built in France, Canada, West Germany, and Japan. Ironically, some of the plants overseas use U.S. developed and licensed technology.

The laws governing the regulation and licensing of nuclear power plants have not been comprehensively modernized since they were enacted in 1954. At that time the commercial nuclear power industry was just beginning, and reactor designs were still untested. Because of this, Congress enacted the present two-step licensing process under which utilities must obtain NRC approval to site and construct a plant and then to operate it. While perhaps appropriate in 1954, this process has caused many utilities serious problems because it postpones safety decisions until construction is nearly finished.

Utilities have often been required to modify plants substantially after they were built, sometimes without any systematic analysis of cost effectiveness or impact on overall safety.

Such last-minute modifications increase the time required to construct and license plants and escalate their cost to the utilities and their ratepayers. At many plants, the cost of these modifications has exceeded the original cost of the plant, leading to decisions to retire incomplete plants rather than complete them. The overall effects are that the siting and licensing process has caused industry and the NRC to be diverted from important safety-related activities, has created an uncertain and unstable regulatory environment, has failed to maximize the effectiveness of the essential public participation in nuclear decisions, and has imposed new or modified safety requirements without any systematic analysis of cost effectiveness or effects on overall safety.

The Chamber's concern with the current archaic, inefficient and inffective, method of licensing is that it wastefully raises the cost of electric power. The result is a lowering of the economic efficiency of public and private-sector enterprises with the subsequent loss of competitiveness to overseas producers. As a result, everybody in the country suffers, particularly those with low incomes or those who may lose their jobs because their employer can no longer compete. The industrial expansion that made this country great was facilitated by the ready availability of ample supplies of economic electric power. Reform of nuclear licensing is necessary to remove an obvious roadblock to continuing such supplies.

PRINCIPLES OF NUCLEAR POWER PLANT LICENSING AND STANDARDIZATION LEGISLATION AND BENEFITS OF NUCLEAR REFORM

In order that electricity consumers can be assured predictable and economic supplies, the Chamber urges the Committee to report legislation to reduce effectively the lead time to site and license a new nuclear plant, without compromising public health and safety and proper public participation, and to provide regulatory stability for plants both during construction and during operation. We recommend the reform be structured around the following four principles:

(1) Certified Standard Designs. The NRC should certify standard plant and subunit designs. The certification(s) should be valid for a set period, renewable as appropriate, and modified only when the Commission concludes a design is unsafe or no longer warranted, after weighing costs and benefits. A goal is type-certification for a reactor and its associated equipment, a safety assurance method used in many other industries.

Standardized plant designs would reduce the cost and time required to bring nuclear power plants on line and, thus, reduce construction costs. Standardized designs would promote safety by concentrating the resources of design engineers and vendors on improved designs and standardized programs of construction practices and quality assurance. Pre-approval of designs would also enable safety reviews to be substantially complete before construction begins.

Importantly, standardized designs would facilitate the sharing of construction experience within the industry, which will, in turn, contribute to safety.

(2) Early Site Approval. The NRC should approve a site before an application to build and operate a nuclear plant is filed. The site approval should be valid for a set period and renewable for an additional period. Standards and criteria necessary to approve a site should remain matters of NRC discretion and expertise.

Early site approval would allow an applicant to obtain NRC approval of sites without committing to build a particular facility by a set date. It would effectively "bank" a few sites and, thus, enhance regulatory stability and a utility's ability to obtain NRC permission to begin construction later because the siting decisions would be separated from need and design decisions.

(3) Combined Construction Permit and Operating License. Especially with type-certification, the NRC could issue a combined construction permit and operating license (of course, only if an applicant demonstrates competence and subject to public hearings). Following the completion of construction, the public should be given an opportunity to request an additional hearing, limited to safety issues that could not have been raised previously. The NRC should not be required to consider or reconsider factual issues that have been resolved in other Commission proceedings.

A combined construction permit and operating license would assure that all significant safety issues are resolved prior to beginning construction and making major financial commitments. Moreover, it would provide for earlier public participation in the nuclear licensing process than under the current process.

(4) Regulatory Stability. Criteria should be set forth to govern all additions, deletions, and modifications to initial NRC requirements, based on a systematic and documented review of the benefits and costs associated with proposed changes.

A systematic, disciplined review of retrofit requirements would enhance the project's overall safety and provide regulatory stability.

CONCLUSION

The present licensing and regulatory process satisfies no one. Industry's and the NRC's resources are being diverted from important safety-related work. The licensing process fails to maximize the effectiveness of public participation. Regulatory uncertainty is causing utilities not to choose nuclear power as a source of new generating capacity. The public and the national economy suffer.

We believe that a restructuring of the NRC licensing process is overdue and urgently needed. The reform measures outlined above, taken as a whole, would contribute greatly to preserving nuclear power as a realistic option to help to meet our nation's electricity needs. We urge the Committee to report S. 2073, licensing and standardization legislation based on these principles.

Senator EVANS. If you would like to proceed, all three statements will be made a part of the record. If you would like to summarize your statements, we will proceed with Mr. Siebert.

STATEMENT OF H. RICHARD SIEBERT, JR., VICE PRESIDENT, RESOURCES AND TECHNOLOGY, NATIONAL ASSOCIATION OF MANUFACTURERS

Mr. SIEBERT. Thank you, Senator Evans.

As consumers of electricity, NAM is very concerned about its cost. NAM supports licensing reform because it can help reduce costs and lead times by eliminating duplicative requirements and by creating greater certainty in its process. Licensing reform can enhance safety by making the system more focused on legitimate health and safety concerns. To maintain the industrial competitiveness of American manufacturing, there must be abundant reliable supplies of electricity at reasonable cost. This requires the ready availability of low-cost electric energy from all available sources.

In the absence of such ready availability, there are bound to be impacts on domestic employment and the U.S. position in international trade. Any actions Congress could take to facilitate abundant supplies of electricity at reasonable cost without entailing environmental health or safety risks would be a major contributor to future American prosperity. Our Nation cannot afford to limit its energy options. A varied and balanced energy mix is crucial to avoid dependence on any one source. Given the problems associated with coal use and the dangers of dependency on oil and gas, our Nation cannot foreclose nuclear development in order to assure more rapid construction of nuclear generating capacity consistent with U.S. safety standards.

Legislation and administrative changes are urgently needed to reform and streamline the existing licensing and siting processes. Reduction of the licensing time requirement will not only help to ensure an adequate supply of electricity, but will ultimately benefit the consumer by reducing the capital costs for total energy requirement.

Thank you, sir.

[The prepared statement of Mr. Siebert follows:]

TESTIMONY OF
THE NATIONAL ASSOCIATION OF MANUFACTURERS

BY
H. Richard Seibert
Vice President
Resources & Technology
NAM

BEFORE THE
SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
S. 2073
"NUCLEAR FACILITY STANDARDIZATION ACT"

APRIL 22, 1986

Mr. Chairman, Members of the Committee, I am H. Richard Seibert, Jr., Vice President of Resources and Technology for the National Association of Manufacturers (NAM). I am accompanied today by Jana Oakley, NAM Director of Energy.

We commend the Committee for holding these hearings and thank the Chairman and his staff for giving NAM this opportunity to express its views on S. 2073, the "Nuclear Facility Standardization Act."

NAM is a voluntary business association of over 13,500 companies, large and small, located in every state. Our members range in size from very large to over 9,000 small manufacturing firms that each have less than 500 employees. NAM member companies employ 85 percent of all workers in manufacturing and produce over 80 percent of the nation's manufactured goods. NAM is affiliated with an additional 158,000 businesses through its Associations Council and the National Industrial Council.

Nuclear energy, a vital component in our energy mix, is our nation's second largest source of electric power. Yet U.S. nuclear power plants are plagued with severe financial problems, escalating costs, concerns about plant safety and uncertainty about predicted future demand for electricity, all of which have led to plant cancellations and delays.

Many of the problems can be traced to burdensome and unpredictable regulatory requirements. The existing nuclear regulatory process was established by the Atomic Energy Act in 1954. The basic regulatory framework has not kept pace with economic and technological developments. The current process is illsuited for regulation of a major commercial power source. It serves neither safety nor efficiency.

Even with continued conservation efforts, demand for electricity can be expected to grow at a rate at least equal to the rate of growth of the nation's economy through the remainder of the century. This demand growth coupled with the need to replace existing generating units as they become obsolete or uneconomic will require new generating capacity.

Today, coal and uranium provide over two-thirds of the fuel needed to generate electricity in the United States. Coal provides about 57 percent, nuclear approximately 14 percent.

Nuclear energy and coal are viewed as the only realistic options for increasing our power supply in the near future. And uncertainties over possible restrictions on the use of coal and the need to minimize dependence on imported energy underscore the importance of nuclear power.

The current circumstance of the nuclear industry presents a paradox. While nuclear energy is the most rapidly expanding source of power, the nuclear option has been characterized as terminally ill. No new power plants have been ordered since 1978 and many plants under construction have been cancelled.

In sharp contrast to the beleaguered situation in this country, nuclear energy is flourishing in other advanced countries. France, Switzerland, Finland, Belgium, Sweden, West Germany and Japan all rely on nuclear power for approximately 25 percent or more of their electricity. France now generates 59 percent of its electricity with nuclear power--Belgium 51 percent, Finland and Sweden 41 percent, Switzerland 32 percent, West Germany 24 percent and Japan 23 percent. The U.S., however, only generates 14 percent of its electricity with nuclear power.

The international surge in nuclear energy is strong evidence of the viability of the nuclear power option and a counterpoint to those who suggest that the problems faced by the U.S. nuclear industry are due to inherent economic disadvantages or safety problems. It defies logic to deny such potential in the United States.

Admittedly, we have our work cut out trying to overcome the obstacles. Average construction costs for nuclear plants more than doubled during the 1970s and are expected to increase even more. A significant factor adding to costs is the length of construction lead times. It takes, for example, 40 percent longer to construct a nuclear plant than a coal plant. Nuclear lead times range between eight and 14 years, and can approach 15 years. In other countries, it takes as little as half that time to construct a nuclear plant.

Long lead times make a utility more vulnerable to high interest rates and inflation. They also impede the ability to accurately assess the extent of the need for new power plants. It is extremely difficult to project power demand more than a decade into the future. The longer it takes to construct a plant, the greater the likelihood of mismatching power supplies and electrical demands. Uncertain demand has been a major factor in many of the recent plant cancellations.

Licensing reform can help reduce costs and lead times by eliminating duplicative requirements and by creating greater certainty in the process. Licensing reform can enhance safety by making the system more focused on legitimate health and safety concerns.

Mr. Chairman, your bill is indeed very timely. We support your legislation calling for: 1) combined construction permits and operating licenses; 2) preapproval of plant designs; 3) early site approval; and 4) centralized review of "backfitting" requirements.

Electric energy is essential to all segments of the economy--for industrial productivity and to maintain our nation's high standard-of-living. Nuclear power has been, and must continue to be, a vital source of power.

To maintain the industrial competitiveness of American manufacturing, there must be abundant, reliable supplies of electricity at reasonable costs. This requires the ready availability of low-cost electric energy from all available sources. In the absence of such ready availability, there are bound to be impacts on domestic employment and the U.S. position in international trade.

Any actions Congress could take to facilitate abundant supplies of electric energy at reasonable costs, without entailing environmental, health or safety risks would be a major contribution to future American prosperity.

Our nation cannot afford to limit its energy options. A varied and balanced energy mix is crucial to avoid dependence on any one source. Given the problems associated with coal use and the dangers of dependence on oil and gas, our nation cannot foreclose nuclear development. It is important to point out that nuclear generation does not result in the emission of any air pollutants which could be an environmental hazard.

In order to assure more rapid construction of new nuclear generating capacity consistent with U.S. safety standards, legislation and administrative changes are urgently needed to reform and streamline the existing licensing and siting processes. Reduction of the licensing time requirement will not only help insure an adequate supply of electricity, but will also ultimately benefit the consumer by reducing the capital costs for total energy requirements.

Thank you, Mr. Chairman and Members of the Committee.

Senator EVANS. Thank you.
Mr. Faden.

STATEMENT OF MICHAEL E. FADEN, LEGISLATIVE COUNSEL, UNION OF CONCERNED SCIENTISTS

Mr. FADEN. Thank you, Senator Evans.

I am here to add a little bit of variety to the proceeding and to show that there is not a consensus in favor of this legislation. We believe it is unnecessary and unwise, and I would like to first ask that my entire statement be put in the record, and second, summarize it, focusing mainly on three specific aspects: First, the context in which this legislation should be examined; second, the question of standardization and how to accomplish it; and third, the impact of this legislation on public participation.

As Senator McClure mentioned earlier, there has not been a new order for a commercial nuclear reactor in this country since effectively in 1974, and there are not any on the horizon. In our view, streamlining licensing will not produce these orders. Only a dramatic change in the economics of electricity production and a sustained period of trouble-free operation of the current generation of nuclear plants will instill the greater public confidence that can lead to new orders.

Unfortunately, in the past year there has been more reason for lowered public confidence in this technology than at any time since the Three Mile Island accident. Near misses at Rancho Seco and Davis Besse along with the one less recently at Salem continue to occur with troubling frequency. Perhaps the most disturbing aspect of this pattern is the degree to which these accidents stem from safety issues that NRC claims to have already addressed.

We would ask several questions. What does this say about NRC's inspection enforcement and regulatory programs when the issues that came up at Davis Besse and Rancho Seco were revealed to be the same as those that caused the Three Mile Island accident, and which NRC claimed were adequately resolved by the actions it ordered after that accident?

What also does it say about NRC when no TVA reactor is generating electricity now because of literally thousands of well documented charges of design defects, workmanship errors, mismanagement, and employee harassment? What does it say about NRC when the Commanche Peak plant in Texas must be subjected to a top to bottom outside quality review after pervasive quality assurance failures came to light on the eve of final licensing because of the persistence of a small group of private citizens and plant employees?

And finally, what does it say about NRC when the Justice Department's former Deputy Chief of Criminal Litigation says, "Watergate hasn't taught these people a thing," speaking of the Commission majority's ongoing efforts to stifle the referral to Justice of criminal violations of the law?

In our view, any legislation affecting the nuclear licensing and regulatory process should have as its prime objective assuring the safe operation of the 100 currently licensed reactors. Unless they operate safely, the hypothetical next generation of nuclear powerplants will remain only blueprints on the desk of the designers who appear before you just before me.

Rather than following the blind alley of licensing reform, we would urge this committee and the Congress as a whole to consider two other related measures that will move in a more positive direction. One is the independent nuclear safety board proposed by Senator Biden in S. 2291, which would investigate accidents and precursors and make recommendations for technical and procedural improvements and generally act as a watchdog.

The second related bill which we expect to be introduced soon would create an Office of the Inspector General in the Nuclear Regulatory Commission. Right now NRC is one of the few Federal agencies that has no inspector general, and it sorely needs one.

Turning now to the legislation before you, as you know, the theme of it is standardization. We support standardization and have supported it at least since 1978. We would in fact go further and say that standardization ought to be made mandatory. In other words, NRC should not allow a nuclear powerplant to be constructed unless it has approved a complete final design that resolves all the outstanding safety problems. That to us is the core of standardization.

NRC already has the regulatory authority to achieve standardization without the passage of this or any legislation as you have heard already. All the agency needs to do is to let the industry know that it will not issue a construction permit unless the applicant submits a complete final design. Unfortunately, the bill before this committee will not achieve that result. It will not achieve standardization because it does not require NRC to license only plants that use a standard design, and it does not require NRC to approve a final design before it issues a construction permit or a one-stop license.

In other words, this bill will not stop the design as you build process, unfortuately, in our view, because that process has been the cause of not only the huge cost overruns that you have seen, as we all have, but many of the safety problems that have arisen. However, this bill has a negative side. It would let NRC standardize designs with unresolved safety issues, and it would place very strict constraints on the safety related upgrades that NRC could offer once a design has been approved.

These constraints are too strict, in our view. The effect of this bill on public participation, the last item of my summary, is in our view almost totally negative. It does not, contrary to what you have heard earlier, expand public participation. It restricts the scope of hearings compared to what is available now to State agencies and to the public. It restricts them in several ways, most drastically at the preoperational stage, the point where a powerplant has been constructed or almost constructed and is ready to go into operation.

At this point a number of issues arise that cannot be dealt with earlier, whether the plant has been constructed according to its design, whether the quality assurance has been adequate, whether the emergency preparedness is adequate, whether the plant's management and operators are prepared and trained effectively. These issues cannot be moved ahead in the process.

Unfortunately, this legislation would effectively close off the public from these issues. It would make it difficult, nearly impossible for the public to obtain an adjudicatory hearing on any of these issues, a hearing which the public is now entitled to as a matter of right. Because of that restriction, if nothing else, we would say that this legislation should not go forward. This legislation will effectively reduce rather than increase the public's confidence in this technology.

We would like to again thank you for the opportunity to present our views, and we certainly will be available for any questions you have.

[The prepared statement of Mr. Faden follows:]

**UNION OF
CONCERNED
SCIENTISTS** 1616 P Street, NW S. 310 · Washington, DC 20036 · (202) 332-0900

Testimony of MICHAEL E. FADEN

LEGISLATIVE COUNSEL, UNION OF CONCERNED SCIENTISTS

Before the
COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

April 22, 1986

On NUCLEAR LICENSING LEGISLATION

I thank the Committee for your invitation to appear today to discuss S. 2073, filed on behalf of the Department of Energy, which would fundamentally revise those provisions of the Atomic Energy Act under which nuclear powerplants are licensed and regulated. My testimony will consist of a general overview, which will attempt to provide some perspective on the context in which this legislation comes to you, and a detailed analysis of the bill and its implications for reactor safety and public protection.

OVERVIEW

The topic of today's hearing is nuclear "licensing reform" -- a phrase which, however well-chosen for its blandness and apparent neutrality, masks fundamental differences about the role of the Nuclear Regulatory Commission, the nature of the industry's problems, and how they can be cured.

We don't intend to be drawn into a false debate. There is no disagreement that standardization of nuclear powerplants -- if properly implemented -- would yield far more safety and cost benefits than the chaotic, one-of-a-kind, design-as-you-go system that we have had for the past two decades. In fact, the Union of Concerned Scientists called for mandatory standardization in 1978, long before it became popular with the industry.

To provide these benefits of improved safety margins and reduced cost, a standard design approval must be based on a thorough review of a complete final design, must resolve all relevant safety issues, and must not sacrifice public participation. It is obviously critical that only sound designs be standardized. Imagine the position that this country's utilities would have been in in 1979 if the Three Mile Island design had been replicated from coast to coast.

Having said that, we believe Congress should focus on the industry's, the NRC's, and the public's greater problem. Remember that the domestic industry has received no new orders effectively since 1974, and none are on the horizon. "Streamlining" licensing will not produce orders. Only a dramatic change in electricity economics and a sustained period of trouble-free operation that instills greater public confidence can accomplish that result.

In the past year there has been more reason for lowered public confidence in this technology than at any time since the TMI-2 accident. Near-misses — Rancho Seco, Davis-Besse, less recently Salem — continue to occur with troubling frequency. Perhaps the most disturbing aspect of this pattern is the degree to which these accidents stem from safety issues that NRC claims to have addressed.

At Davis-Besse last June, multiple equipment failures and human errors led to a total loss of all heat removal capability. At Rancho Seco last December, more than 11 malfunctions and safety problems occurred in an hour, leading to rapid and severe overcooling of the reactor and causing the collapse from exhaustion of a senior reactor operator. Worst of all, both Davis-Besse and Rancho Seco were designed by Babcock and Wilcox — as was TMI-2 — and many of the safety problems these incidents revealed were identical to those involved in the TMI accident which NRC claimed were adequately resolved by actions it ordered after that accident.

What does this say about NRC's inspection, enforcement and regulatory programs? What does it say about NRC that no TVA reactor is generating electricity because of literally thousands of charges of poor design and workmanship, mismanagement and harassment of employees? What does it say about NRC when Comanche Peak must be subjected to a top-to-bottom outside review after pervasive quality assurance failures came to light on the eve of final licensing because of the heroic persistence of a small group of private citizens and plant employees?

And finally, what does it say about NRC when the Justice Department's former deputy chief of criminal litigation says, "Watergate hasn't taught these people a thing," speaking of the Commission majority's ongoing efforts to stifle the referral to the Justice Department of criminal violations of law?

Any legislation affecting the nuclear licensing and regulatory process should have as its prime objective assuring the safe operation of the 100 currently licensed reactors. Unless they operate safely, the hypothetical "next generation" of nuclear powerplants will remain only blueprints on some designer's desk. As it currently functions, NRC does not instill that assurance, which is the sine qua non for renewed public confidence.

Rather than following the industry down the blind alley of "licensing reform", Congress should consider two related measures that will move in a more positive direction:

— an independent Nuclear Safety Board, along the lines of Senator Biden's S. 2291, that would investigate accidents, near-misses and precursors, make recommendations for technical and procedural improvements, and act as a watchdog to see these recommendations put into effect. There is a pressing need for such an outside body of experts; as Senator Biden pointed out in his introductory remarks, "There have been simply too many NRC investigations that have failed to meet basic standards to assure public safety for us to allow a continuation of business-as-usual."

— an NRC Inspector General, reporting directly to the Congress as well as the Commissioners. For no apparent reason, NRC is one of the few federal agencies that does not have an independent Inspector General. One is needed now more than ever; the pressures on NRC's investigating staff to soft-pedal criticisms of the industry appear to be intensifying. The Inspector General's function would differ from that of a Safety Board in that he would primarily review how NRC enforces its rules and standards, rather than attempting to analyze the technical causes of particular reactor incidents.

An agenda that puts these proposals ahead of the industry's attempts to once again effectively cut the public out of the reactor licensing process would show that Congress can look at all the facts that have given rise to nuclear power's current de facto moratorium and rise above the industry's special pleading. UCS calls on this committee to shape such an agenda. It will take strong medicine to cure nuclear power's ills — medicine that the industry must take itself, rather than try to force-feed the public.

DETAILED TESTIMONY

This portion of my testimony will attempt to answer four central questions:

1) Will this legislation assure standardization of designs for future nuclear powerplants?

2) Does this legislation preserve the NRC's authority to diagnose and correct safety problems once a reactor is licensed?

3) Will this legislation fully protect the public's right to participate in NRC licensing decisions?

4) Will this legislation revive the nuclear option?

The answer to each of these questions, in our view, is "no".

The theme of this year's nuclear licensing legislation is standardization. All three bills filed to date — the NRC bill (S. 836, H.R. 1447), the DOE bill (S. 2073, H.R. 2488) being heard here today, and the Broyhill/industry bill (H.R. 1029) — have been touted as encouraging the standardization of future reactor designs. This theme reflects a healthy (if belated) realization that many of the industry's recurrent problems stem from the "design-as-you-go" practices that have persisted since its early years.

But, more importantly, this emphasis on standardization also underlines the industry's need to deflect the controversy that has surrounded earlier legislative attempts to effectively exclude the public from the nuclear regulatory process. Unfortunately, these bills go at least as far as past years' proposals -- in some respects, even farther -- in cutting back the rights of citizens to have a role in the licensing of nearby reactors.

To the extent that their proponents focus on standardization, the effect of these bills has been grossly misrepresented. Far from simply encouraging standardized designs, these bills would fundamentally alter the balance in the Atomic Energy Act, adhered to by the Congress for three decades, in favor of public participation as a tradeoff for the preemption of state and local regulatory power over nuclear hazards. As they stand, these bills only further entrench in the law the special treatment accorded the commercial nuclear industry -- the only private industry already exempt from normal tort liability as well as state and local safety regulation. This special treatment, objectionable in the abstract, is certainly not merited by the industry's record.

My testimony today will not attempt to thoroughly analyze every provision of the DOE bill. It will also not describe in detail the nuclear licensing process and how (if at all) that process relates to nuclear power's current *de facto* moratorium. Both of these topics were discussed at length in the testimony submitted in 1983, when Congress considered very similar bills. They are also treated extensively in the more recent UCS report "Safety Second: A Critical Evaluation of the NRC's First Decade". All I will try to do today is highlight the major problems we see in this bill, and I will emphasize why it fails to deliver what it promises.

1) S. 2073 does not achieve standardization.

Standardization of nuclear powerplant designs, done correctly, is a progressive concept. It can provide safety benefits as well as time and cost savings. Most other countries long ago recognized this fact and embarked on programs of standard plant designs. UCS has supported standardization since at least 1978, and we still do. But this legislation is not necessary to make it happen, and this legislation will not make it happen.

The licensing process does not hamper the use of standardized designs.

This legislation is neither necessary nor sufficient to cure nuclear power's ills. At the outset, it is important to make one crucial distinction: the root cause of the American nuclear industry's many problems is not the NRC's licensing process. As former Commissioner Peter Bradford told this subcommittee last session, "The NRC hearing process ranks very low among the issues that have brought nuclear power to its present situation. NRC hearings did not cause Three Mile Island. NRC hearings did not bring about the cancellation and default at the WPPSS units. NRC hearings had nothing to do with the quality assurance breakdowns at Diablo Canyon and Zimmer. NRC hearings are not causing the Midland containment to sink. NRC hearings are not even at the bottom of the cost overruns at Shoreham and Seabrook."

Most of these misfortunes stemmed from the industry's failure to finish designing its reactors before it starts building them. Its historic "design-as-you-go" approach has been responsible for many -- if not the great majority -- of the cost overruns and safety lapses that have made headlines in recent years. By hampering advance planning, making quality assurance immeasurably more difficult, and exacerbating the need for expensive change orders and reworks, this basic industry practice has done more to raise the costs and extend the duration of nuclear powerplant construction than an army of intervenors could ever do.

This legislation is also unnecessary because NRC already has all the legal authority it needs to license standardized plant designs — a point the agency admitted in its 1983 Congressional testimony. Under NRC's rules (10 C.F.R. Part 50, App. Q pars. 5, 7), any standard design it approves can be referenced in a license application, and no party can subsequently challenge the design's validity. In fact, NRC has all but approved two standard designs submitted by General Electric and Combustion Engineering. Westinghouse is developing an advanced pressurized water reactor design, which it expects to submit for NRC approval. It is hardly the case that NRC has erected barriers to standardization; instead, the industry, for reasons of its own, has until recently insisted on building custom-designed plants.

S. 2073 does not rule out "design-as-you-build" plants.

The key element of genuine standardization is simply requiring the applicant to submit a complete, final design before construction begins. Only a complete design permits meaningful NRC review, advance resolution of safety issues, and a clearly-scheduled construction process. Once NRC makes design-in-advance a legal requirement, economic pressures will render custom designs all but obsolete. However, the DOE bill does not require NRC to license only plants that use a standard design. Nor does it require NRC to receive and approve a final plant design before it issues a construction permit or a "1-step" license. In other words, S. 2073 does not guarantee standardization or stop the "design-as-you-go" process.

S. 2073 does not even define what is meant by a standardized design. The NRC bill (sec. 202) defines a "standardized design" as "a design which the Commission determines is sufficiently detailed and complete to support licensing" of a commercial reactor "or approval of a major portion of such a facility...and which is usable for a multiple number of units and/or at a multiple number of sites without reopening or repeating the review." Since NRC has previously used its discretion to allow reactors to begin construction after reviewing only a "conceptual" design outline, this definition gives little confidence that the Commission will ever insist on a complete, final design.

In fact, industry leaders appear to believe that NRC should accept for a construction and operating ("1-step") license roughly the same level of design detail — in the future called "design criteria" — that it now requires for a construction permit. Under this process, the detailed engineering drawings would be developed in a later "design implementation stage". The trade press has quoted technical staff of a prominent architect-engineer as suggesting that "at least" 20% of the plant's engineering would have to be completed before NRC issues a 1-step license — which would amount to no improvement at all over past practices. Thus it is clear that neither bill would prohibit NRC from approving "designs" and licensing plants on the basis of 20-25% of the final plant design — an indefensible compromise in any measure that purports to encourage design standardization.

S. 2073 would let NRC standardize designs with unresolved safety issues.

This legislation fails to recognize that standardization only improves the safety of plants if the design that is standardized has resolved the safety problems that have persisted in the custom-designed plants. S. 2073 does not direct the NRC to reject a design unless all outstanding safety issues have been resolved. This omission would allow the NRC to institutionalize, in a standard design, the avoidance of the final resolution of generic safety issues that has characterized its approval of custom designs for two decades. If Congress truly wants to get this industry's house in order, no single step would have greater impact than to direct NRC to approve only complete, final plant designs that resolve all outstanding safety issues.

S. 2073 insulates standard designs, once approved, from future upgrades.

Although S. 2073 adds little to NRC's authority to approve standard designs, it does restrict the agency's authority in certain dangerous ways.

S. 2073 would make it very difficult to raise any serious design issue once NRC has approved a standard design, either in a subsequent plant license proceeding or in an amendment to the design approval itself, regardless of whether the particular issue was litigated in the original design proceeding. The proponent of reopening must show that any proposed design modification is required to protect the public health and safety -- a tall order, when even the NRC needs a great deal of research to fully analyze many emerging safety issues.

By also demanding that any design modification must "result in a substantial improvement in overall safety" of plant operations, the DOE bill redirects the agency's focus from the reliability of any individual plant safety system to the more amorphous calculations of "overall" plant safety that are easily manipulated in a probabilistic risk analysis.

The DOE bill would apparently make a design approval "conclusive" for 10 years, no matter what information is later discovered. It is extremely ill-advised to statutorily prohibit the prompt correction of design mistakes. Should NRC have licensed clones of TMI-2 immediately after the accident? This language would on its face ordain just such a result, by precluding the Commission from ordering changes in a design it had previously approved.

S. 2073 makes the design approval effective for 10 years, with an infinite number of 10-year renewals granted almost automatically. On renewal, the bill shifts the burden of proof to the public to show that the design does not meet current safety standards. Under current law, the burden would remain with the approval-holder to show that the design still meets those standards -- a potentially difficult burden, given the many new safety issues that arise during any 10-year period of reactor development.

S. 2073 does not contain a "due diligence" requirement to assure that a design approval-holder is making its best efforts to upgrade the design. The net result is to encourage NRC to "grandfather in" obsolete designs for decades.

S. 2073 also subsidizes the nuclear industry by directing NRC to defer payment of the application fee for design approvals until the design is actually used, or until the end of the 10-year approval period. This amounts to an interest-free loan of millions of dollars to companies like Westinghouse and General Electric -- hardly the most needy recipients of scarce federal credit.

Section 193f of S. 2073 would effectively nullify all restrictions in an approved design or operating license. This remarkable provision expands a clause in NRC's rules to allow licensees, at their own discretion and without notice to NRC, to deviate from "any aspect of" the approved design unless the licensee determines that the deviation involves a change in technical specifications or an unreviewed safety question. We can confidently predict that licensees will not be overly strict in interpreting these standards, since, as Saint Benedict observed 500 years ago, it is far easier to beg forgiveness than to ask permission.

Finally, we must point out that, while the scope of the NRC bill is generally restricted to light-water reactors, the DOE bill would also apply to designs for breeder reactors and reprocessing plants -- two relatively untested and possibly even more dangerous types of nuclear facilities. The bill's procedural shortcuts and backfitting constraints are entirely inappropriate when not one commercial breeder reactor or reprocessing plant is under serious consideration, much less operating in this country.

2) S. 2073 unwisely limits the NRC's ability to enforce its safety rules.

S. 2073 does not merely "encourage" design standardization, as its supporters claim. As the previous section explained, its purpose is to make standard designs — and, for that matter, many other licensing actions — very difficult to modify even when serious safety issues later arise. This attacks the NRC's own ability to enforce the Atomic Energy Act as well as the public's faith that the highest safety standards are being observed. In this respect, the legislation moves far beyond a prudent, rational policy of standardization and becomes a mechanism to insulate the industry from necessary safety improvements.

The failures of perhaps 17 separate pieces of equipment at the Davis-Besse (OH) reactor, and the tortuous chronology of NRC indecisiveness that led up to that incident (revealed through a prompt investigation by the House Subcommittee on Energy Conservation and Power) highlight the already inadequate level of NRC's oversight of commercial reactors. In brief, NRC's internal unwillingness to force the licensee to make important post-TMI improvements combined with the licensee's own opposition and obfuscation to delay the installation of a highly reliable auxiliary feedwater system. When several other pumps and valves failed to operate as expected, Davis-Besse was faced with the beginnings of a Three Mile Island-like accident. Fortunately, the operators reacted quickly and prevented a sustained loss of cooling water.

This incident illustrates why any attempt to restrict NRC's power or willingness to enforce stringent safety standards can have potentially devastating consequences. Viewed in that light, the provisions in the DOE bill that limit NRC's legal authority to order changes in the designs, hardware or operations of nuclear powerplants are worse than mischievous.

Backfitting

Under Section 104 of S. 2073, no change in the design, construction, operations or staffing of a plant could be required unless the Commission finds that it will "result in a substantial improvement in overall safety of facility operation". This improvement must be "justified when taking account of the remaining life of the facility". The bill also directs the NRC to "establish a centralized, systematic and documented review process to evaluate and consider a proposed change."

Industry advocates like to use the term "backfits" to describe changes that NRC orders after a plant has received its license (and in some cases its construction permit). This term is used very loosely and, in our opinion, inaccurately by licensees who claim they have spent large sums of money on NRC-required improvements. The overwhelming majority of upgrades required in plants are not a result of applying new regulations to increase safety. They are needed when it becomes apparent, too often belatedly, that the plant does not in fact meet the regulations which it supposedly met when it was licensed — that is, the changes are needed to restore the level of safety that was originally assumed.

Robert Minogue, the NRC's director of research, explained in a 1979 internal memorandum how the need for "backfits" resulted when reactor designs went from 60 megawatts to almost 1200 megawatts in little more than a decade:

"This rapid increase in power levels occurred without obtaining any substantial operating experience on the nuclear plants at intermediate levels prior to increasing the size to higher levels. * * * I think that much of the racheting of regulatory requirements for the operating plants about which industry has complained has been a direct result of the fact that the unduly rapid push to larger sizes has resulted in what amounts to a generation of prototypes...this situation was almost inevitable given the substantial extrapolation from the early technology."

Alvin Weinberg, an industry pioneer since the 1940's, recently reflected on the developmental path the industry took and how it has led to numerous backfits:

"I often have felt that we went too fast in our conventional light water reactor development, that much of nuclear energy's travail would have been avoided had we moved more deliberately...if we build reactors too quickly we have no way of knowing whether the system will last anywhere near thirty years, nor can we incorporate lessons learned in earlier reactors into later ones without expensive backfits. This is now happening with many light water reactors--steam generators and pipe cracking may limit their lifetime seriously, even though we have learned ways of dealing with these problems."

Most of NRC's safety standards are very vague. Many consist of little more than platitudes: thou shalt be protected against fires, thou shalt have a reliable system for decay heat removal. There is often very little pre-operational review of the manner in which a given plant meets these standards. Applicants' commitments are accepted as a basis for licensing. Later, after an incident such as the recent failures at Davis-Besse or through research results, NRC may learn that one or many plants are not adequately protected against a certain hazard. It must then order design or operational upgrades so that each plant will meet the minimum requirements of the existing regulations. This is not a "backfit" in any objective sense, because it is necessary to comply with the standards which the plant was thought to have already met.

S. 2073 would bring even these clearly necessary upgrades to a screeching halt. It would classify design or hardware changes that are necessary to comply with existing safety regulations as "backfits", and would make NRC follow an onerous, time-consuming process simply to require a plant to meet the standards which it should have met when it was licensed. As the Davis-Besse history illustrates, NRC has already gone overboard in its zeal to avoid ordering needed improvements. To tie the agency's hands further would clearly be contrary to the public interest.

Despite repeated requests, neither DOE nor NRC has furnished a single example of an unnecessary backfit. Under NRC's procedures, the licensees have had the right to dispute any backfit, and they certainly have the resources to exercise that right. Since in each case they have already accepted NRC's judgment, they should not be heard to complain now.

By its reliance on the phrase "improved overall safety", S. 2073 also implicitly requires all backfits to be justified by a probabilistic risk assessment (PRA) that analyzes the major accident sequences involving the entire plant. PRA's are complex quantitative analyses, based on thousands of sometimes arbitrary and unverifiable assumptions, that can be manipulated to reach a predetermined result. They are subject to overall uncertainties of such enormous magnitude that they cannot furnish a sound, independent basis for regulatory decision-making. Instead, PRA's provide the illusion of precision -- an illusion that can never be verified simply because their great complexity and cost render PRA's totally inaccessible to public review and testing. (In fact, simply submitting a PRA can stymie NRC's decision-making process for as much as two years while the agency, relying on the national laboratories, goes about the laborious task of reviewing it in detail.)

These points have been made so many times by technical experts, including members of the NRC's own Advisory Committee on Reactor Safeguards, that one can only conclude that both agencies' reliance on PRA as the determining factor in backfitting decisions is a deliberate attempt to simply stop any more backfitting. In September, 1982, ACRS members Myer Bender and Jeremiah J. Ray advised the NRC: "The claims for PRA concerning its ability to assess public safety risk are little more than a sham that will hide the fact that the basis for safety will always depend upon the judgment of a few individuals." Because, as Bender and Ray point out, PRA's cannot accurately function as an indicator of overall safety, no licensing "reform" should ever explicitly or implicitly require their use.

The bill's directive to "justify" the backfit by considering the remaining life of the facility is presumably based on either the dubious assumption that the probability of an accident is lower when the remaining plant life is shorter, or the crass fiscal reality that the cost of safety improvements may measurably reduce an aging plant's profitability. This clause would have the pernicious effect of mandating a lower standard of safety for the oldest reactors -- those most likely in need of upgrading.

In summary, this backfit provision is essentially a surrogate for prohibiting backfitting altogether — much as the NRC's recent rules change, which we have challenged in federal court, attempts to do in the same indirect ways. S. 2073 would effectively legislate a presumption against modifying operating plants to incorporate new information on safety issues — the opposite of what the Kemeny Commission recommended and what should be the rule. Absent compelling reasons to the contrary, important safety improvements should be required in the current generation of reactors. After all, they — rather than any hypothetical future reactors — pose the real risk to the public.

Congress should decline to enter this highly technical controversy, and instead should direct the NRC to move faster to resolve the many remaining generic safety issues.

Cost/Benefit Balancing

The DOE bill (finding 7) introduces the concept that NRC shall specifically consider costs in setting safety standards. Although NRC has recently begun to overtly employ a cost/benefit analysis in regulatory decisions, there is a very serious question as to whether this approach is consistent with the Atomic Energy Act or represents sound regulatory policy. We believe that it is neither.

Fundamentally, cost/benefit analyses do not provide an honest basis for nuclear safety decisionmaking. They are very likely to be used to forestall safety improvements indefinitely. This Committee will certainly recall some of the classic cost/benefit "analyses" done for water projects by the Army Corps of Engineers, whose juggling and rejuggling of the figures to justify a preset conclusion was legendary. Protection of the public from nuclear hazards is too important to be relegated to the same treatment.

The NRC (and before it, AEC) case law is remarkably consistent in its acceptance of the principle that costs are not a legitimate factor in safety decisions:

> "[I]n the safety sphere the evaluation of the risks attendant to reactor operation is not undertaken as an element of NEPA-type process by which costs may be traded off against benefits. Rather, the function of the evaluation is to ascertain whether the ultimate, unconditional standards of the Atomic Energy Act and the regulations have been met; e.g., whether the public health and safety will be adequately protected."
> Maine Yankee Power Company (Maine Yankee Atomic Power Station), ALAB-161, 6 AEC 1003, 1007 (1973).

As this excerpt indicates, adoption of a cost/benefit approach to nuclear safety regulation would represent a dramatic departure from the guiding regulatory principles the agency has consistently followed. While cost/benefit analyses have a certain superficial appeal (who can oppose preventing wasted expenditures?), this initial attractiveness cannot withstand close scrutiny. The central problem is that, while the cost of any safety improvement is relatively easy to calculate, the benefits cannot be accurately quantified.

The "benefit" side of the ledger is the reduction of risk. This reduction can only be measured by the use of a probabilistic risk assessment (PRA). However, as we explained previously, the bottom-line results of any PRA are enormously imprecise for the most serious accidents. The uncertainty bands range to a factor of 100 or more. This inherent lack of precision makes a quantitative balancing of costs against benefits essentially meaningless.

Cost/benefit analysis, like PRA, then becomes a tool that can be manipulated to produce a preselected result. This is a game which not everyone can play; even the NRC staff cannot easily analyze, let alone rebut, the massive PRA's that industry consultants dump on their desks, and the public is left completely on the sidelines. Given this basic mismatch, the adoption of a statutory requirement for cost/benefit balancing in safety decisions will tie the NRC's hands and offer the industry's lawyers a potent weapon with which to resist any regulatory action.

3) S. 2073 undercuts the public's right to participate in licensing decisions.

Major provisions in S. 2073 would effectively deny members of the public their right to raise legitimate safety issues, particularly when a reactor is about to go into operation. These safety issues include such key questions as whether the reactor was constructed according to its design, whether the plant's operators and management meet NRC's standards, and whether emergency preparedness around the plant site is adequate. These issues are among the most controversial at a number of reactors now approaching final licensing.

We hardly believe that it will improve this industry's credibility to "streamline" the licensing process in ways that will reduce the public's right to be heard. But, more importantly, the effect upon the public's health and safety could be profound. If the public did not have a legal forum in which to document massive breakdowns in quality assurance and shortfalls in emergency planning, the Zimmer plant might now be posing a clearly unacceptable risk to those living near it. Zimmer is far from the only example of a reactor that was almost allowed to proceed to operation before the persistence of individual citizens led to the disclosure of serious defects; Comanche Peak, South Texas and Midland, among others, come to mind.

"Inspections, tests and analyses"

The gravest threat to the public is contained, ironically enough, in the seemingly innocuous phrase "inspections, tests and analyses" that is inserted in section 103 of S. 2073. A recent D.C. Circuit Court of Appeals case (Union of Concerned Scientists v. U.S. Nuclear Regulatory Commission, 735 F. 2d 1437) held that NRC cannot deny the public an adjudicatory hearing on any issue that is material to its licensing decision. The Appeals Court, *inter alia*, rejected NRC's argument that the issue in question — the results of emergency preparedness exercises -- fell outside the scope of the legally-required public hearing because it involved decisions that "rest solely on inspections [or] tests", a phrase used in the Administrative Procedure Act to exempt certain issues from formal hearing procedures.

In a bit of tricky drafting, the authors of S. 2073 have essentially attempted to wrap every pre-operational issue in the "inspections, tests and analyses" cloak. If this language were enacted into the Atomic Energy Act, it very likely would be interpreted to allow NRC to designate every pre-operational safety issue -- and certainly the construction quality assurance issues that have bedeviled a number of less careful utilities — to be decided in a non-adjudicatory fashion. The net result would be to preclude any inquiry into how well the plant was actually built, and how closely it conformed to the paper design, from the only forum in which the public can introduce its own evidence and cross-examine the utility's and the NRC's experts. (The NRC staff's track record on its own inspections and tests provides little assurance that construction failures will be discovered or acted upon promptly.)

"Good Cause" for hearings

S. 2073 also contains highly restrictive language that effectively destroys the public's right to a pre-operational adjudicatory hearing, instead making such hearings discretionary on the part of the NRC. Given the pressures outside and within NRC — at times approaching hysteria -- to avoid "licensing delays", it is highly likely that NRC will most often find no "good cause" to grant a citizen's request for a hearing; that has been the agency's pattern even under the present law.

This "good cause" requirement is implemented by a thoroughly murky set of findings that will keep lawyers busy for decades, but which you can be sure will not be used to freely grant hearings even if the aspiring intervenor manages, in the 30 days the bill allows, to "set forth in reasonable detail the facts and arguments" upon which his request for a hearing is based. Formal discovery will presumably not be available during that period, placing the would-be intervenor in the Catch-22 position of not being entitled to a hearing without showing sufficient facts but not being able to discover those facts until he is granted the hearing.

As if this were not enough, S. 2073 makes its intentions perfectly clear by explicitly giving NRC authority to allow a completed powerplant to commence operation before the hearing is completed. This, of course, precisely reverses the present NRC law, under which (at least in theory) the applicant always has the burden of proving that its plant is built properly and ready to operate.

4) Enactment of S. 2073 will further erode public confidence in the safety of nuclear power and the competence of the NRC.

The nuclear industry's more aggressive advocates claim that enactment of licensing "reform" legislation is necessary — although they admit it is not sufficient — to revive the nuclear option sometime in the next decade. They somehow believe that the public's — and the investment community's — faith in this technology will be restored if only the NRC can license plants in record time, stifle debate about their safety, and refrain from applying later lessons to earlier reactors. (These characterizations are, of course, a little extreme — but they are not unwarranted; these are certainly the directions in which this legislation goes.)

We can safely say that no amount of this sort of regulatory "reform", however sweeping, will cure the nuclear industry's ills. The industry's safety, reliability, financial and public acceptance problems will not be erased by curtailing adjudicatory hearings or placing restrictions on backfits so onerous as to prevent the correction of serious safety defects.

On the contrary, enactment of this legislation will produce two negative results: it will simply hide many of the real problems from view and make it less likely that they will be addressed until after the next accident or near-miss, and the mere fact of its passage will further reduce public confidence in the technology and its regulators.

This bill is one-sided. It moves only in the direction of restricting the public's access to the licensing process. Nothing in it would lead, directly or indirectly, to an improved level of safety in any reactor, current or future. Rather, it encourages compromises on essential safety protections. The bill's standardization provisions do not require standardization and may have the perverse effect of institutionalizing incomplete, inadequate reactor designs.

The Kemeny Commission's paramount conclusion was that:

"To prevent nuclear accidents as serious as Three Mile Island, fundamental changes will be necessary in the organization, procedures, and practices -- and above all -- in the attitudes of the Nuclear Regulatory Commission and, to the extent that the institutions we investigated are typical, of the nuclear industry.

* * *

The Commission is convinced that [NRC's] attitude must be changed to one that says nuclear power is by its very nature potentially dangerous, and, therefore, one must continually question whether the safeguards already in place are sufficient to prevent major accidents."

This bill embodies precisely the mindset and attitude condemned by the Kemeny Commission. It comes closer to deregulating nuclear power than any proposal ever previously advanced. Congress should summarily reject it.

Industry advocates argue that they need regulatory "stability", and that word occupies a prominent place in the purpose clauses of this bill. In fact, the concept of "stability" highlights the central, unstated premise of the legislation now before you. It only makes sense to "reform" nuclear licensing as this bill proposes if one has such a high level of confidence in the safety of current plants and the competence and vigilance of the NRC that one believes that citizen participation is expendable. As most recent public opinion surveys show, the American people do not have such a high level of confidence in this technology or its regulators. In our view, that lack of confidence is fully justified by the experience of the last quarter-century.

At this point in history the burden of proof must be on the nuclear industry. How do they explain Zimmer, Salem, Midland, Diablo Canyon and South Texas -- not to mention TMI-2, Salem, Davis-Besse and Rancho Seco? How many more examples are necessary to make the case for stricter safety regulation and strong citizen participation?

Before the Congress again puts its imprimatur on the current state of this technology — and that is exactly what it would do by passing either of these bills — it ought to pause and consider whether the moratorium the industry now faces should be the occasion for a fundamental reassessment of, not the licensing process, but the technology itself. As former TVA Chairman S. David Freeman acutely points out, "The truth is that the regulator only mirrors the technology." By its handling of this bill, Congress should send a clear message to the nuclear industry: Your problems are yours to solve; we will not paper them over with procedural fixes. You must achieve technological stability, at a level of safety the American people can live with, before we can even consider offering you regulatory stability. If the industry perceives and acts on that message, it will have reached a new level of responsibility and maturity.

Senator **EVANS**. Thank you, Mr. Faden.

Dr. Anderson.

STATEMENT OF DR. JOHN A. ANDERSON, EXECUTIVE DIRECTOR, THE ELECTRICITY CONSUMERS RESOURCE COUNCIL

Dr. **ANDERSON**. Thank you.

I am John Anderson, executive director of the Electricity Consumers Resource Council, and I appreciate the opportunity to be here today. ELCON is a group of large industrial consumers of electricity with facilities in most of the 50 States and many foreign countries. Our members produce a wide range of products, but what bands them together is, they are large electricity consumers. Therefore they are very interested in legislation affecting the nuclear licensing.

At the outset I would like to emphasize two reasons why we are not here, though. We are not here today, first, because we are nuclear zealots. I would like to emphasize that electricity from a variety of fuel sources works just as well in the devices of our members as they produce the steel, aluminum, automobiles, or chemicals.

And second, we are not here because we see a crisis with regard to capacity shortfalls in the near term, as has been alluded to by several witnesses earlier today. Rather, our members have looked very carefully at the capacity conditions that face the United States, and feel very strongly that we have adequate capacity for some time in the future. We do think, though, that that provides an opportunity where we could look at nuclear licensing in a rational way, and we think this is a good opportunity therefore for us to implement nuclear licensing reform.

We are here today, though, because we think that nuclear licensing reform makes good business sense. To be competitive, the United States must be assured of an adequate, reliable, and efficient supply of electricity. Utilities must be able to build an appropriate mix of generating units to enable them to meet the electricity needs of all consumers at least cost, and by least cost we very simply mean at the lowest dollar cost to consumers.

We think that the nuclear option has been foreclosed. We do not believe that it is looked at as a viable option today, and there are many reasons for this, things like load growth has fallen, utilities' financial health has fallen. Some opponents of nuclear industry oppose any construction, no matter what its conditions are.

We do not think it has to take as long, though, to build a powerplant as it does take. We think it should not take as long to build a nuclear plant as it does today, and we even go further and say that if it does take as long to build a plant as it does today, the companies that belong to ELCON cannot afford to buy the power that comes from it. And so we do urge you very strongly to consider reform.

We believe that efforts should be made to reestablish the nuclear option without sacrificing safety, and we have in our statement outlined five different areas that we think should be explored. They involve back fitting, one-stop licensing, private hearing processes, early site permitting, and preapproval of design. These have been discussed by witnesses before me, and of course they will be included in the record. Because S. 2073 is consistent with this position that we have set forth, we urge its passage.

Thank you very much for the opportunity to be here.

[The prepared statement of Dr. Anderson follows:]

ELCON

STATEMENT OF THE
ELECTRICITY CONSUMERS RESOURCE COUNCIL (ELCON)
BEFORE THE
COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ON
NUCLEAR LICENSING REFORM
(S. 2073)

April 22, 1986

I am John Anderson, Executive Director of the Electricity Consumers Resource Council (ELCON). I am pleased to appear before this Committee today to support passage of S. 2073 -- a bill to improve the nuclear licensing process.

ELCON is a group of large industrial consumers of electricity with facilities in most of the 50 states and many foreign countries. Our members produce a wide range of products including steel, aluminum, chemicals, industrial gases, glass, motor vehicles, textiles and food. The attached Fact Sheet lists the ELCON member companies and our fundamental principles.

ELCON members consume approximately ten percent of all electricity sold to industrial customers and nearly five percent of all electricity consumed in the United States. Our members require an adequate and reliable supply of electricity at reasonable prices. Thus, they have a continuing interest in all aspects of electric utility regulatory reform including proposals to modify the nuclear licensing process.

REASONS for Supporting Nuclear Licensing Reform

At the outset, I would like to emphasize that ELCON does not support nuclear licensing reform because of a preference for nuclear power. We are not nuclear zealots. Indeed, as a practical matter, our members do not have a preference as to the fuel source utilized by the utility to produce the electricity that they use to produce their products. Electricity produced by nuclear generating units works just as well as electricity produced by coal or other sources as our members produce steel, aluminum, automobiles or chemicals. We simply do not desire to see the nuclear option foreclosed for reasons over which we have control.

Additionally, we do not support nuclear licensing reform because we are concerned about potential future capacity shortfalls in the electric utility industry. Electricity is the lifeblood of industy. Our members' need for adequate and reliable supplies has led ELCON to analyze very carefully future projections of demand and generating capabilities -- both on a national and region basis. We presented the results of our analysis to this Committee last July.[1]

---

[1] Statement of John A. Anderson, Executive Director of the Electricity Consumers Resource Council (ELCON) on "When Will The Lights Go Out?", Committee on Energy and Natural Resources, U.S. Senate, July 25, 1985.

We updated our original analysis during the fall of 1985 to include more recent utility projections. Results of this update are highlighted in Table 1.

This research shows that the electric utility industry at present is awash with capacity. Utilities report a national reserve margin of 33.9 percent today. Utilities themselves say that this margin will fall only to 25.5 percent by 1994

We do support nuclear licensing reform because it makes good business sense.

To be economically competitive, the U.S. must be assured of an adequate, reliable and efficient supply of electricity. Utilities must be able to build an appropriate mix of generating units to enable them to meet the electricity needs of all customers at least cost.[2]

In providing electricity at least cost, ELCON believes

---

[2] Throughout this statement, we use the term "least cost" as defined by the Federal Energy Regulatory Commission (FERC) in a Notice of Proposed Rulemaking (at 48 Federal Register 21163, May 11, 1983):

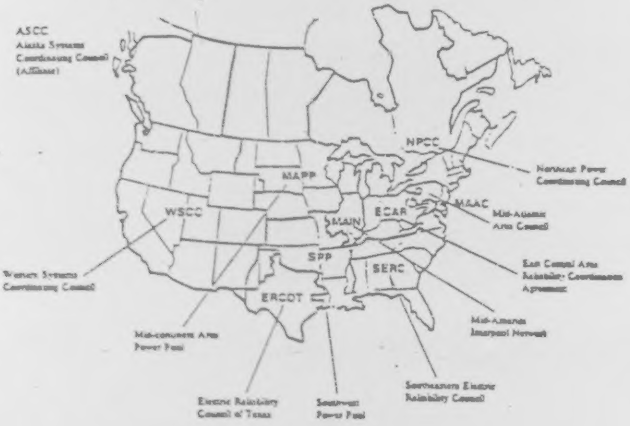
> The term "least cost energy strategy" is often associated with what is known as the "soft path" to energy supply - small scale, decentralized electritity technologies and renewable fuel resources. Here the term is used in a literal sense - the supply of electricity to consumers in the short- and long-run at the lowest possible cost (in the economic sense) without any predetermination as to whether the energy is produced by "soft" technologies, "hard" technologies or some combination of the two. As a regulatory agency, we are concerned with removing any hindrances that might prevent utilities from moving along the path of providing their customers with a reliable supply of electricity at lowest possible cost.

SUMMARY TABLE 1

U.S. Reserve Margins Under Alternative Supply and Demand Scenarios

Scenario:	Peak Growth Rate-%	Reserve Margins--% 1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
(a) Base Case	2.31	33.9	32.6	34.3	34.9	33.5	32.2	30.0	29.4	27.9	27.0	25.5
(b) High Growth	3.47	33.9	32.2	32.3	31.1	28.5	25.7	22.2	20.0	17.1	14.8	12.1
(c) Double Growth	4.62	33.9	30.7	29.4	26.8	23.0	18.9	14.3	11.0	7.0	3.8	0.1
(d) Nuclear Moratorium	2.31	33.9	32.6	34.3	32.5	30.1	28.3	26.1	24.9	23.2	22.4	20.8
(e) Coal Derating	2.31	33.9	32.6	28.5	29.1	27.8	26.5	24.5	23.6	22.3	21.5	20.1
(f) Alternative Energy	2.31	33.9	33.3	35.6	36.8	36.0	35.1	33.5	33.4	32.3	31.9	30.8
(g) High Growth & Alternative Energy	3.47	33.9	32.8	33.6	32.9	30.9	28.5	25.5	23.7	21.1	19.3	16.8
(h) Double Growth & Alternative Energy	4.62	33.9	31.4	30.6	28.6	25.2	21.6	17.3	14.4	10.7	7.8	4.4
(i) Alternative Energy & Repowering	2.31	33.9	33.6	35.7	36.9	36.1	35.2	33.7	35.5	32.6	32.1	31.1
(j) High Growth, Alternative Energy & Repowering	3.47	33.9	33.1	33.7	33.0	31.0	28.6	25.6	23.8	21.4	19.4	17.0
(k) Double Growth, Alternative Energy & Repowering	4.62	33.9	31.7	30.8	-28.6	25.3	21.7	17.5	14.5	11.0	7.9	4.5
(l) Repowering of Planned Retirements	2.31	33.9	32.9	34.5	35.0	33.7	32.3	30.2	29.6	28.2	27.2	25.8

NORTH AMERICAN ELECTRIC RELIABILITY COUNCIL


ASCC
Alaska Systems Coordinating Council (Affiliate)
NPCC
Northeast Power Coordinating Council
MAPP
MAAC
Mid-Atlantic Area Council
WSCC
ECAR
MAIN
East Central Area Reliability Coordination Agreement
SPP
SERC
Western Systems Coordinating Council
ERCOT
Mid-America Interpool Network
Mid-continent Area Power Pool
Southeastern Electric Reliability Council
Electric Reliability Council of Texas
Southwest Power Pool

that utilities must be able to consider all options. For example, we believe that utilities should continue to explore the feasibility of utilizing solar, wind, water, geothermal and cogeneration facilities, if economical. However, we believe that the amount of additional electricity that can be supplied from these alternatives is limited for some time to come. Present technology limits the commercial development of solar, wind and other natural resourcesto small power needs in selected applications; cogeneration is limited by thermal and other needs of industry; and most economically-viable hydro sites presently are developed.

Nuclear power certainly has the potential of being efficient. There are 101 nuclear reactors representing 87,485 MW of capacity in operation today. These units provided 14 percent of the U.S. electricity supply in 1985. The number of operating units is expected to grow to 120 within the next 10 years.

But today utilities do not consider the nuclear option viable. No new orders of nuclear units have been placed since 1978. By the end of 1985, 111 units representing 122,311 MW of capacity were cancelled.

There are many reasons why utilities do not view nuclear as a viable option today. Electric load growth has fallen dramatically from levels experienced just a few decades ago causing utilities to reassess their need for any new capacity. The financial condition of utilities for several years deteriorated to such an extent that utilities found it difficult to finance any substantial construction program. Opposition by opponents of any nuclear power development received sustained media attention.

Additionally, problems with the present licensing process have severely inhibited the development of nuclear power. Problems with the licensing process significantly increase the time required to construct a nuclear unit and, hence, its costs.

We believe that improvements in the efficiency of the licensing procedure can help revive the nuclear option without compromising safety. Our views were stated in more detail in testimony on S. 893 and S. 894 submitted to the Subcommitte on Nuclear Regulation, U.S. Senate, in 1983. A copy of that testimony is attached to this statement.

RECOMMENDATIONS

ELCON believes that efforts should be made to reestablish the nuclear option without sacrificing safety. Modifications to the existing licensing process would not solve all the problems associated with nuclear power, but would help remove artificial barriers to a valuable domestic energy source.

After careful consideration, we offer the following conceptual suggestions that we believe would assist in reestablishing nuclear power as an option to be considered by utilities in their long-term plans. Our suggestions are based on the belief that making the licensing process more predictable will enhance the ability to assess the need for nuclear facilities and, simultaneously, reduce both the construction period and the unit's costs - without compromising safety.

Our recommendations involve five aspects of the licensing process:

- BACKFITTING - All backfitting proposals should be scrutinized through a centralized process. The NRC should conduct a quantitative assessment of each proposal and find that the backfit would result in an improvement in the protection of the public health and safety and the costs are justified.
- ONE-STEP LICENSING - Utilities should be allowed to apply for a combined construction permit and operating license (CP/OL). The granting of the CP/OL would require the utility to meet specified construction and operating standards. The NRC shoud be required to audit the entire construction process, be assured that the unit will be appropriate, and verify that necessary safety precautions have been implemented.
- HYBRID HEARING PROCESS - A process should be established that encourages resolution of issues in other than adjudicatory hearings. Written statements from all parties first should be presented to and evaluated by the NRC. Oral presentations should be allowed but not mandated. Adjudicatory hearings should be utilized only when it has been demonstrated that less formal proceedings cannot resolve substantial disagreements regarding basic public health and safety issues. Public hearings should not be held unless requested by either intervenors or the NRC. Issues once resolved should not be reheard unless substantial new material facts are introduced.
- EARLY SITE PERMIT - Utilities should be able to certify a site as suitable for a nuclear unit prior to expending significant resources in demonstrating the need for the plant and making a commitment to build.
- PRE-APPROVAL OF DESIGN - The NRC should be encouraged to preapprove designs for major subsystems or entire units. Pre-approved designs could increase safety by providing a more detailed review of fewer variables and decrease costs by shortening the construction period.

Because S. 2073 is completely consistent with this position, ELCON urges its passage.

Thank you for the opportunity to appear before you today and share our views.

STATEMENT OF THE
ELECTRICITY CONSUMERS RESOURCE COUNCIL (ELCON)
TO THE SUBCOMMITTEE ON NUCLEAR REGULATION
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE
REGARDING S. 893 AND S. 894

Electricity Consumers Resource Council (ELCON)
1828 L Street, N.W., Suite 403
Washington, D.C. 20036
(202) 466-4686

JULY 1983

STATEMENT OF THE ELECTRICITY CONSUMERS RESOURCE COUNCIL TO THE SUBCOMMITTEE ON NUCLEAR REGULATION COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE REGARDING S. 893 AND S. 894

The Electricity Consumers Resource Council (ELCON) is pleased to submit the following statement regarding S. 893 and S. 894. These bills would modify existing Nuclear Regulatory Commission (NRC) licensing procedures.

ELCON is a group of 16 large industrial consumers of electricity with facilities in most of the 50 states.*/ ELCON advocates and promotes the development and adoption of coordinated, rational and consistent federal, state and local policies which will assure an adequate, reliable and efficient electricity supply for all users at prices based on the costs incurred in serving customers.

ELCON's members consume approximately 10 percent of all electricity sold to industrial customers and nearly 5 percent of all electricity sold in the U.S. Because of our members' use of electricity, ELCON has a significant, continuing interest in the electric utility industry and we appreciate the opportunity to comment on this legislation.

SUMMARY

ELCON believes that conventional electrical generating technologies and fuels must be relied upon to provide the major share of our electrical needs at least through the remainder of the 20th century. The quantity of additional electricity

that can be supplied economically from alternative energy and technological sources (such as solar, wind, water, geothermal and cogeneration) is very limited over the next two decades. Although fossil fuels remain the key natural resource input for our electricity generating capacities, the long-term energy interests of our country are clearly served by actions, such as improved licensing procedures, that enhance the economics of a nuclear option.

It is beyond our expertise to propose specific remedies to problems presently encountered in the development of nuclear power. Rather, we offer conceptual suggestions that, if refined and implemented, we believe would help shorten the nuclear licensing and construction period and reduce costs, without compromising safety.

Our recommendations involve five aspects of the licensing process:

- BACKFITTING — All backfitting proposals should be scrutinized through a centralized process. The NRC should conduct a quantitative assessment of each proposal and find that the backfit would result in an improvement in the protection of the public health and safety and that the costs are justified.
- ONE-STEP LICENSING — Utilities should be allowed to apply for a combined construction permit and operating license (CP/OL). The granting of the CP/OL would require the utility to meet specified construction and operating standards. The NRC should be required to audit the entire construction process, be assured that the unit will be appropriate, and verify that necessary safety precautions have been implemented.
- HYBRID HEARING PROCESS — A process should be established that encourages resolution of issues in other than adjudicatory hearings. Written statements from all parties first should be presented to and evaluated by the NRC. Oral presentations should be allowed but not mandated. Adjudicatory hearings should be utilized only when it has been demonstrated that less formal proceedings cannot resolve substantial disagreements regarding basic public health and safety issues. Public hearings should not be held unless requested by either intervenors or the NRC. Issues once resolved should not be reheard unless substantial new material facts are introduced.
- EARLY SITE PERMIT — Utilities should be able to certify a site as suitable for a nuclear unit prior to expending significant resources in demonstrating the need for the plant and making a commitment to build.

---

*/ ELCON members are: Air Products and Chemicals, Inc.; Airco, Inc.; Anheuser-Busch Companies, Inc.; Armco Inc.; Bethlehem Steel Corporation; Diamond Shamrock Corporation; E.I. du Pont de Nemours & Company; FMC Corporation; General Motors Corporation; Kaiser Aluminum & Chemical Corporation; LCP Chemicals & Plastics, Inc.; Olin Corporation; PPG Industries, Inc.; Stauffer Chemical Company; Union Carbide Corporation; and United States Steel Corporation.

- PRE-APPROVAL OF DESIGN — The NRC should be encouraged to pre-approve designs for major subsystems or entire units. Pre-approved designs could increase safety by providing a more detailed review of fewer variables and decrease costs by shortening the construction period.

DISCUSSION

ELCON represents industrial electricity consumers. Our members depend upon large quantities of reliable electric power. There are no practicable alternative energy sources for many electricity uses and electricity is the most expensive energy our members purchase.

ELCON believes that to be economically competitive, the U.S. must be assured of an adequate, reliable and efficient supply of electricity. Utilities must be able to build an appropriate mix of generating units to enable them to meet the electricity needs of all customers at least cost.[1]

In providing electricity at least cost, ELCON believes that utilities must be able to consider all options. For example, we believe that utilities should continue to explore the feasibility of utilizing solar, wind, water, geothermal and cogeneration

facilities if economical. However, we believe that the amount of additional electricity that can be supplied from these alternatives is limited for some time to come. Present technology limits the commercial development of solar, wind and other natural resources to small power needs in selected applications; cogeneration is limited by thermal and other needs of industry; and most economically-viable hydro sites presently are developed.

Our views are consistent with many respected energy analysts. For example, Mr. John M. Marcum, Assistant Director for Energy, Office of Science and Technology Policy, Office of the Vice President of the United States, stated:

> "Even the most bullish prognostications for the 'soft' energy sources ... do not allow for more than a small fraction of the nation's [electrical] needs by the year 2000. This leaves oil, natural gas, coal and uranium to provide the major share of energy needs, just as they do today."[2]

Although our country's fossil fuel resources presently are the foundation of our energy security, it is clearly in the country's interest to build upon this foundation through more efficient licensing procedures that improve the economics of the nuclear option.

While urging the reestablishment of the nuclear option, we emphasize that we are not nuclear zealots. Indeed, as a practical matter, our members do not have a preference as to the fuel source utilized by the utility to produce the electricity that they use to produce their products. Electricity produced by nuclear generating units work just as well as electricity produced by coal or other sources as our members produce steel, aluminum, automobiles or chemicals. We simply do not desire to see the nuclear option foreclosed for reasons over which we have control.

1/ Throughout this statement, we use the term "least cost" as recently defined by the Federal Energy Regulatory Commission (FERC) in a Notice of Proposed Rulemaking (at 48 Federal Register 21163, May 11, 1983):

> The term "least cost energy strategy" is often associated with what is known as the "soft path" to energy supply — small scale, decentralized electricity technologies and renewable fuel resources. Here the term is used in a literal sense — the supply of electricity to consumers in the short- and long-run at the lowest possible cost (in the economic sense) without any predetermination as to whether the energy is produced by "soft" technologies, "hard" technologies or some combination of the two. As a regulatory agency, we are concerned with removing any hindrances that might prevent utilities from moving along the path of providing their customers with a reliable supply of electricity at lowest possible cost.

2/ Letter by John Marcum to the Washington Post, June 17, 1983, page A-16.

THE RISE AND FALL OF THE NUCLEAR OPTION

The first commercial order for a nuclear generating unit was placed in 1954.[3] As of May 1983, our nation had 83 licensed nuclear units in operation. Nuclear units generated 12.5 percent of our nation's electricity last year. The number of operating nuclear units is expected to grow to 130 within the next ten years. Nuclear power clearly has demonstrated that it has made an important contribution to our electric power system.

But the nuclear option is not viable today. New York State Electric and Gas canceled their 838 mw Bell Station unit in 1972 commencing a trend that continues to the present. By the end of 1982, utilities had canceled a total of 100 units representing 109,754 mw of capacities. No new orders of nuclear units have been made since 1978 and equipment manufacturers do not believe that utilities are seriously considering placing any new orders in the near term.

NUCLEAR LICENSING REFORM IS NEEDED

There are many reasons why utilities do not view nuclear as a viable option today. Electric load growth has fallen dramatically from levels experienced just a few decades ago causing utilities to reassess their need for any new capacity. The financial condition of utilities for several years deteriorated to such an extent that utilities found it difficult to finance any substantial construction program. And

opposition by opponents of any nuclear power development received sustained media attention.

Additionally, problems with the present licensing process have severely inhibited the development of nuclear power.[4] Problems with the licensing process significantly increase the time required to construct a nuclear unit and, hence, its costs. We think that improvements in the efficiency of the licensing procedure can help revive the nuclear option without compromising safety. These thoughts are based on several studies such as those discussed briefly below.

The U.S. Energy Information Administration (EIA) recently released a report on causes, costs and consequences of nuclear plant cancellations.[5] In this report, the EIA states "...continuously changing regulations, licensing delays and uncertainty surrounding future standards for nuclear plants ... have substantially contributed to the cancellation of 38 units. While utilities acknowledge their responsibility for the safe utilization of nuclear power, they also feel that the regulatory environment is unnecessarily cumbersome."[6] Similarly, the Electric Power Research Institute (EPRI) reports that more than 20 percent of nuclear plant construction problems are due to "regulatory ratchet."[7] Since EPRI limited its analysis to the "construction" phase only (EPRI did not study the planning, licensing and startup phases in this

---

3/ Data regarding orders and cancellations are from Nuclear Plant Cancellations: Causes, Costs and Consequences, Energy Information Administration, U.S. Department of Energy, Washington, D.C., DOE/EIA-0392, April 1983, pages 4-5. Data regarding the current status of the nuclear industry and projections of future units are from testimony delivered by Energy Secretary Donald P. Hodel before the Subcommittee on Nuclear Regulation, Committee on Environment and Public Works, U.S. Senate, May 26, 1983, pages 2-3.

4/ We recognize that some people believe that the nuclear licensing process is working just fine. By this, we mean that some people are unalterably opposed to the development of nuclear power and find the present regulatory process a very effective means to achieve their preconceived end.

5/ DOE/EIA, op. cit.

6/ Ibid., page 25.

7/ An Analysis of Power Plant Construction Lead Times, Volume I: Analysis and Results, Electric Power Research Institute (EPRI), Palo Alto, California, EPRI EA 2880, February 1983, pages 2-13.

report), the total regulatory problems certainly represent more than 20 percent of the total problems.

We don't think that it must take as long as it presently does to build a nuclear unit. For example:

- On average, it now takes more than twelve years to build a nuclear unit in the U.S.[8]
- In 1965, it only took 6.3 years, on average, to build a nuclear unit in the U.S.[9]
- Nuclear units of similar design and size are routinely built in five to six years in foreign countries:
  - — The Electric Power Research Institute (EPRI) states that "In Japan, France and Sweden ... nuclear plants can be built in approximately 60 months."[10]
  - — France put eight 957 megawatt (mw) PWR units into commercial service in 1981 alone. Construction periods for these units ranged from 58 months to 78 months.[11]
  - — A 950 mw BWR unit was recently built for the Taiwan Power Company in 61-1/2 months.[12] This unit met all U.S. nuclear licensing requirements, and all design changes recommended by the equipment manufacturer were included.

---

[8] "Power Plant Scheduling, Construction, and Costs," Ramesh N. Budwani, Power Engineering, August 1982, page 38. Construction periods are defined as the time between the ordering of the nuclear steam supply system (NSSS) and fuel loading.

[9] "Power Plant Capital Costs Going Out of Sight," F.C. Olds, Power Engineering, August 1974, page 38.

[10] An Analysis of Power Plant Construction Lead Times, Volume I: Analysis and Results, Electric Power Research Institute, EPRI EA-2880, February 1983, pages 2-16.

[11] Nucleonics Week, November 12, 1981, page 5. NW reports construction times for the following Electricite de France units: Fessenheim-1, 78 months; Bugey-1, 77 months; Tricastin-3, 68 months; Tricastin-4, 66 months; and St. Laurent-des-Eaux-B1, 58 months. PWR stands for pressurized water reactor.

[12] Engineering News Record, May 26, 1983, page 27. ENR reports that Taiwan Power's Kuosheng-3 had fuel loaded 61-1/2 months after the first concrete was poured. BWR stands for boiling water reactor.

These data demonstrate that it takes approximately twice as long today to build a nuclear unit either as it took in 1965 in the U.S. or as it takes today in other countries. We believe that this difference is prima facie evidence that a significant problem exists.

Studies and data such as those discussed above lead us to conclude that licensing reform could significantly reduce the time required to build a nuclear unit. Reductions in construction periods could allow utilities to predict the need for the units with more accuracy and reduce substantially the required costs. It is practically impossible to accurately predict the need for new facilities twelve to fourteen years into the future. These needs are assessed much more accurately over shorter planning horizons. And while it is difficult to assess the cost impact of reduced construction periods, a major builder of nuclear units estimates that reducing the construction period from fourteen to nine years would save 35 percent of the costs.[13]

LICENSING REFORM IS TIMELY

The existing nuclear licensing process was established in 1954 by the Atomic Energy Act. The process has been modified slightly in the twenty-nine years following passage of the AEA, however its structure is still basically as it was nearly three decades ago.

At the time of passage of the AEA, there were very few nuclear units either planned or in operation. Nuclear technology was at an early stage of development. There were many first-time nuclear applicants, designers and contractors, and many novel design concepts. Accordingly, the licensing process was structured to allow licensing decisions to be made while design work was still in progress and to focus on case-specific reviews of individual plant-site considerations.

---

[13] "Electricity and the Economy," Bechtel Power Corporation, San Francisco, California, February 1983.

Since 1954, more than 80 nuclear units have been built and another 50 are under construction. The experiences learned as these units were built have convinced a broad spectrum of individuals, groups and organizations that the licensing process should be revised. For example, two major governmental reports commissioned to study the Three Mile Island accident emphasized the importance of changing the licensing process to focus on issues of public health and safety and of making public participation more meaningful.14/ The Nuclear Regulatory Commission has conducted an internal examination and concluded that "...its present licensing procedures are not the most effective or efficient means of licensing nuclear plants and that the licensing process must be reformed."15/ As a result, the NRC has proposed both administrative and legislative modifications to the licensing procedures. Additionally, after a detailed review of existing procedures, the U.S. Department of Energy concluded that "The current regulatory process does not appear to fulfill the needs of the participants — that is, the public, the regulators, the consumers, and the industry ... It is time for the licensing process to be reexamined from the point of view of twenty-five years of experience, and to be upgraded to meet the current needs of all parties to the regulatory process."16/

14/ "Kemeny Report" by the Presidential Commission that reviewed the Three Mile Island accident and the "Rogovin Report" by the NRC Special Inquiry Group on Three Mile Island.

15/ Testimony of Nunzio J. Palladino, Chairman, NRC, before the Subcommittee on Nuclear Regulation, Committee on Environment and Public Works, U.S. Senate, May 25, 1983, pages 2-3.

16/ Testimony of Donald P. Hodel, Secretary, U.S. Department of Energy, before the Subcommittee on Nuclear Regulation, Committee on Environment and Public Works, U.S. Senate, May 26, 1983, pages 1-3.

RECOMMENDATIONS

ELCON believes that efforts should be made to reestablish the nuclear option without sacrificing safety. Modifications to the existing licensing process would not solve all the problems associated with nuclear power, but would help remove U.S. imposed artificial barriers to a valuable domestic energy source.

It is beyond our expertise to propose specific remedies. Rather, we offer the following conceptual suggestions that we believe would assist in reestablishing nuclear power as an option to be considered by utilities in their long-term plans. Our suggestions are based on the belief that making the licensing process more predictable will enhance the ability to assess the need for nuclear facilities and, simultaneously, reduce both the construction period and the unit's costs — without compromising safety.

Our recommendations involve five aspects of the licensing process:

- BACKFITTING — The current licensing process does not contain a systematic and ordered process for evaluating the need for design modifications — or backfits — of nuclear units. The NRC has identified 87 different procedures by which modifications can be ordered before, during and after a unit is built. Technical problems associated with one particular unit may result in recommendations for changes in many unaffected units, often without adequate consideration of the impact of the change on either safety or performance.

  ELCON recommends that all backfitting proposals should be scrutinized through a centralized process within the NRC. The NRC should conduct a quantitative assessment of the seriousness of the problem, the possibility of the problem occurring in other units, the expected safety improvements associated with the recommended solution (both on the unit directly affected as well as on units potentially affected), and the expected costs over the remaining life of all affected units. The NRC should be required to find that the backfit would result in an improvement in the protection of public health and safety and that the costs are justified prior to ordering the backfit.

  ELCON recognizes that the NRC presently is evaluating its backfitting procedures and is implementing some changes. However, we believe that long-term predictability and stability of the licensing process can be increased with legislated guidelines.

- ONE-STEP LICENSING — Present licensing procedures require the issuance of both a construction permit (CP) and an operating license (OL). The CP is granted when design work is in the early stages — often when only 20-25 percent complete. The OL is granted after the plant is built — many years later. Public hearings are required for both the CP and the OL. Issues identical to those debated during the CP hearing often are raised a second time at the OL hearing, causing a time-consuming and inefficient reconsideration of a concern that was resolved earlier.

  Reconsideration of the same issues should be avoided. If separate CP and OL licenses are to be issued, the issues included in the hearings for each should be strictly limited to the topics appropriate to each license. Issues debated and resolved at the CP hearing should not be reheard at the OL hearing.

  ELCON believes that improvements in the licensing process could be realized by allowing utilities to apply to the NRC for a combined CP/OL in one proceeding. The granting of the combined CP/OL would require the utility to meet specified construction and operating standards and the NRC to audit the entire construction process. Before the unit is placed in operation, the NRC must be assured that the operators are properly trained, appropriate evacuation plans have been implemented, etc. A combined CP/OL procedure would: allow a more efficient and systematic review by the NRC at an early stage in the process; encourage utilities to submit applications with more design work completed; increase the predictability and certainty of the overall process; and provide an earlier and more meaningful hearing procedure.

- HYBRID HEARING PROCESS — The present hearing process requires extremely time-consuming and complex adjudicatory hearings to resolve all issues — even issues that have been resolved at earlier stages in the process.

  ELCON believes that adjudicatory hearings are necessary to resolve key issues that involve factual disputes. However, we believe that opponents to nuclear power often are able to utilize the hearing process as a means to achieve their preconceived goals at the expense of consumers of electricity.

  We recommend the establishment of a process that encourages resolution of issues in other than an adjudicatory hearing. Written statements from all parties first should be presented to and evaluated by NRC. Oral presentations should be allowed but not mandated. Adjudicatory hearings should be utilized only when it has been demonstrated that less formal proceedings cannot resolve substantial disagreements regarding basic public health and safety issues. Under no circumstances should formal hearings be held unless requested by either outside intervenors or the NRC. Issues once resolved should not be reheard unless substantial new material facts are introduced. Such a procedure would be in compliance with the Administrative Procedures Act and would not conflict with the requirements of the National Environmental Policy Act.

- EARLY SITE PERMIT — Present procedures require a utility to demonstrate the need for a plant and make a commitment to build a facility before engaging in a site review. The NRC has promulgated regulations providing an opportunity for site review issues and the issuance of a Staff Site Report prior to a utility's decision to apply for a CP. However, the staff Site Report would not be binding on the NRC under the regulations.

  We believe that utilities should be able to certify a site as suitable for a nuclear unit prior to demonstrating a need for a unit. This certification should be binding on the NRC unless material facts are introduced demonstrating physical changes have occurred that make the site now unsuitable for a nuclear unit. Such a procedure would add predictability and encourage more effective public participation in the site selection process before significant resources are expended.

- PRE-APPROVAL OF DESIGN — When applying for a CP, utilities typically submit design information covering only about 20-25 percent of the completed unit. Design work then continues during the construction period. Current NRC regulations allow a vendor to seek staff approval of a preliminary or final design separate from a CP application. However, this staff approval is not binding on the NRC.

  ELCON believes that at the request of a manufacturer or vendor, the NRC should be encouraged to pre-approve designs for major subsystems or entire units. This would allow a utility to select a pre-approved design rather than be required to comply with a design approval process for each unit built. The NRC should specify the data required for pre-approval and would monitor the construction to be certain that the final unit meets the safety and other requirements of the design.

  Pre-approved designs could decrease substantially the time and resources required for the design, review, certification and construction of units since units could be standardized rather than each being a customized design. Pre-approved designs could help build in safety by providing more detailed review of fewer designs, focusing attention on fewer plant-specific problems and providing a broader base of experience on general problems.

Senator **Evans**. Thank you.

Let me start with Mr. Faden. I guess the first and most fundamental question, Do you believe that we ought to have nuclear energy as an option at all?

Mr. **Faden**. The Union of Concerned Scientists does not oppose nuclear power in principle. We think if it is used it should be used safely. We do not think that that issue whether there should be nuclear power at all is bound up in this legislation, though. We think that the industry has shown that it can build plants quickly and within budget. The example of St. Lucie II in Florida has been referred to several times before in this hearing. They brought that plant in in about 6½ years, and within about, I think, 10 percent of their budget. They did that because of two factors.

They had a complete design going in. They used virtually the same design as they had used at St. Lucie I, and they had very tightly controlled hands on management by that utility. They took charge of the construction process. They did not allocate it. They were on top of it from day one. And that made a big difference. That showed that it is not impossible in the current licensing structure to bring in a plant at about the same time that it takes in a number of other countries, and so we do not think this legislation is the be all and end all, the make or break of whether the nuclear option will succeed or not. We think you have to look back at the industry itself to see whether they will be able to succeed.

Senator **Evans**. Do you think by and large the industry, and I guess I have used that in its broadest sense, everything from utilities to the designers and suppliers, the nuclear industry are more competent, less competent, as competent as the similar industries in France, Japan, other countries?

Mr. **Faden**. I think you have got a much wider variation here than you do in those countries logically because there are many more actors here. In Japan you have, as you heard earlier, eight or nine utilities. In France you have effectively one. They are more tightly controlled. They are more tightly disciplined. They also have achieved more than we have in a number of aspects of plant construction and operation. For instance, in Japan they do not have the steam generator corrosion problems that we have here in pressurized water reactors because they control their water chemistry much more carefully, so we do have a few things to learn. But I think a lot of the problem in this country is that you have a number of utilities in the past decade try to get into the act that were very unprepared for it, and the result was often either technical or financial disaster.

Senator **Evans**. Is one of the, and I do not know how familiar you may be with procedures in these other countries. Let us pick France and Japan as two examples of very large use of nuclear power and strong movements ahead. What do you know of their public participation and the degree to which how many repetitive opportunities there are to intervene and to litigate? How would you compare that with what we have currently?

Mr. **Faden**. In France there is no effect of public participation to speak of. It is a very highly centralized, I would call it technocratic structure. The result is that when people oppose a nuclear powerplant there, they try to get together 100,000 other people of similar mind, and they have a small riot at the site, and that has been a very unsatisfactory way of dealing with it.

Senator EVANS. A hundred thousand would be a fairly large riot, I would suggest.

Mr. FADEN. In Japan they are also—it is sort of halfway in the middle. There is not the same degree of public participation that there is here. It is much more tightly restrained, but there is a system there. You often hear the comparable figures of how long it takes to construct a plant in Japan. What those figures normally do not include is site selection, because there is an extensive process of site approval that goes on before the formal construction process starts, and that can often take years in itself, and what that process revolves around is, to put it in the vernacular, cutting a deal with the people who live in the vicinity. It usually involves agreeing on some form of payment or subsidy to the local government or to a fisherman's cooperative or to all of the affected interests. That can take many more years than the siting process in this country.

Senator EVANS. Would you suggest that if we were to go to— well, first, you, as I understand it, oppose this legislation but would not necessarily oppose legislation that would be more specific and stringent in defining what constitutes complete design or standardized design. Would you say that some legislation along this line of carefully crafted would be a step forward?

Mr. FADEN. We do not think legislation is necessary, but we do think legislation along the lines that you suggested could improve the situation.

Senator EVANS. What would you suggest under those circumstances where you would have to have a complete design, and of course, you know, we might find our way through a standardized design that was financed primarily by the company who would supply the elements of that plant. It comes down to the utility, however, being primarily required to expend the money necessary for site investigations, and leading to site specific standardized design.

If we are to move in that direction, do you think that the utilities or the utility commissions ought to authorize that expenditure in the rate base?

Mr. FADEN. I think if a utility can make an adequate showing of ultimate need for power, that at some point down the pike they will need this power, then the utility commission should be able to put that in the rate base.

Senator EVANS. Regardless of whether it ultimately leads to a plant that can or will be built or not, but if there appears at the time to be the need for power and the utility operates in a responsible, respectable manner, but for whatever reasons cannnot ultimately succeed, do you think that ought to be allowed in the rate base?

Mr. FADEN. I think so. I think that is one of these, almost a classical prudency question, was it a prudent expenditure at the time.

Dr. ANDERSON. Could I comment on that?

Senator EVANS. Any one of the three of you are certainly welcome to comment.

Dr. ANDERSON. As representing large consumers of electricity, we feel very strongly that, the prudency issue aside, if it was a prudent decision to begin construction of a plant, and then after some time a prudent decision was made to cancel that plant and that was a prudent decision in a timely manner, that utilities ought to have the right to collect from ratepayers in whatever is the appropriate way, whether that is to put it in the rate base, but they certainly should have the right to collect from ratepayers the dollars that they spent during that length of time. It is very complex, of course, and you have to look at whether they are going to get back dollars on a present value basis that equals the amount that they spent over that length of time, but we feel very strongly that they should.

One thing that I think you have asked several questions that I would like to come back and address very briefly is this idea of the turnkey process versus a cost plus process, and one thing that I think this legislation would help move toward, and I think sometimes it is moot whether the Nuclear Regulatory Commission thinks that it has the authority to do things today or it thinks that it does not. The fact is that they have not done it, and this legislation would move us down a path that would help transfer some of the risk toward the constructors of the power plants.

It is a very difficult one to know how long it is going to take to build, and it is difficult to know how much the costs are going to be over a great length of time, but the way we have it today, most of the risks seem to go on to the ratepayers or if after the fact, Monday morning quarterbacking, we try to stick the utility with it, it gets stuck on the utility, and I think that the legislation as you have it under consideration would start to take some of that risk and appropriately put it on the builders of the powerplant.

Senator EVANS. Dr. Anderson, you in your testimony did comment on the apparent current surplus capacity we have and the fact that it will remain in your view and in the view of your members for some extended period of time, and that in moving toward least cost strategies you may be pursuing or favoring a future that would emphasize perhaps smaller, more easily brought on line power elements, probably even those things that would lead to greater efficiencies in the use of current power sources, all of which tends to move in a direction away from base powerplants, in particular, from base power to nuclear powerplants. Is that an accurate understanding?

Dr. ANDERSON. Well, I think it is. We would respond, I think, in a slightly different way, but perhaps come to the same kind of conclusion. The members of ELCON are being driven by market forces, and we feel that the market forces are working very well. The price of electricity has gone up and gone up very dramatically, and this has forced them to make actions they have tried to conserve.

They have developed new technologies to be able to produce products. There are some very phenomenal results associated with this. Just to cite one specific example, it used to take about 3,000 kilowatt hours per ton to manufacture chlorine, and now you can do it with less than 2,000 kilowatt hours per ton, and that is a tremendous improvement, and these kinds of examples go through many different industries, but I think it would be important to put it into perspective and say that our members are primarily electricity consumers. They are not primarily electricity producers. And again, I emphasize that they do not know the fuel source when they buy electricity from a utility. The electricity generated from hydroelectric facilities or coal units works just as well as that from a nuclear central station unit.

The thing that they see and the thing that they react to is how much does that electricity cost. And it is a fact today that many smaller units are producing electricity that costs less than many larger units are, and that does not mean that economies of scale are gone from an engineering standpoint. It simply is a fact that if a new central station unit costs $3,000, $4,000, $5,000 or more per kilowatt in fixed cost before it is completed and starts to generate electricity, then the cost of the electricity that comes out of it is going to be very expensive, and probably is going to be so expensive that it is uneconomic.

Senator EVANS. Really, your conditions on a utility really begin and end with two fundamental concerns, price and availability. Well, avilability including reliability.

Dr. ANDERSON. That is true. I would again emphasize, though, that our companies would like very much to buy electricity from the utilities even though it looks sometimes like they are trying to generate it themselves today, and in fact they are. Yes, it is the price and the adequacy and reliability of the power.

Senator EVANS. Mr. Siebert, in your testimony you mentioned that even with continued conservation efforts, demand for electricity can be expected to grow at a rate at least equal to the rate of growth of the Nation's economy through the remainder of this century. That sounds like a little different prediction than the one of Dr. Anderson's. And I wonder, has your organization done any analysis or is that sort of a sense of what you think will happen?

I have seen some other predictions that tend to move in a different direction than that.

Mr. SIEBERT. Senator Evans, that is the sense of the companies. We have not done a particular analysis per se.

Senator EVANS. Dr. Anderson, do you have any from your organization? Would you like to comment?

Dr. ANDERSON. Yes; we have not done an analysis trying to relate the growth of electricity to the growth of the economy. I know that many people try to link electricity growth to GNP, and I at least feel many times they make a very critical mistake in linking kilowatt hour consumption of electricity with growth in GNP, and that is comparing apples and oranges. What we really need is some sort of a link of total peak demand for electricity, which is the criteria that brings about the need for power stations, new capacity, and the growth in the economy.

We have not done so, and I say that it is not useful at this point to do so, because what my members tell me, and especially in the steel industry, the aluminum industry, and basic chemical industry is that several very major factors are happening that may undo whatever relationship historically did exist in the broadest sense right now. Steel, aluminum, and basic chemicals, at least electricity intensive basic chemicals are in a real depressed situation.

And there is a question as to whether they will ever come back or not, and no matter how good the black box is, no matter how good a computer analysis is of the historical relationship and projecting it into the future, if these major electricity consuming sectors of the economy do not come back, then we are not going to see the linkage as it used to be at all.

Second, electrification is going on at a tremendous rate in many, many industries, but the electrification cuts both ways on electricity consumption, and I think we have to look very carefully at how it is going to cut. To a large extent it is going to cut depending upon the price. This is driving companies to do things, but let me give one specific example. We hear a lot of talk about robots. We hear a lot of talk about how the American industry is now buying and developing robots. Robots, we must recognize, do require electricity both to produce them and to operate them, but one of the primary ways that they are being used is in work space areas where there is a high degree of pollution of some sort or another.

For example, General Motors tells us that they are putting robots first in paint spraying booths. What this does is reduce dramatically their electricity consumption required to space condition the air where people used to be. Robots can work in very dirty air. And the net effect on electricity consumption for moving in this way may very well be down at least on a peak basis and not up.

This tells me that the linkage between GNP and electricity consumption is highly questionable from a computerized or an econometric situation, and that I think what we ought to be looking at first and foremost is, are we going to have basic industry in the United States, basic industry that consumes large quantities of electricity. As you know from your state, the direct service industrials, are they going to come back, and are they going to buy power off a BPA's system or not?

Senator **Evans**. And of course we in the northwest have a somewhat different problem. It is probably one of the few places in the country where we are energy rather than capacity constrained, but even there the newest opportunities have little to do with the building of major central power stations. In fact, our electric power plan for the next 20 years even at medium growth shows no need for any major new power stations. There are just simply other alternatives that are cheaper and better and more easily achieved. It is only when you get to fairly high growth rates, which we do not think we will see, that any further power stations are needed for the rest of this century.

One of the biggest, currently one of the biggest opportunities for new electricity comes from the aluminum companies themselves offering to sell conservation to the Bonneville Power Administration, and I think that is a pretty good tradeoff, where by purchasing conservation you are just as good electricity as any other kind, and the aluminum companies get the benefit of that purchase and can turn it around into what is necessary to reduce their electrical costs in creating a pound of aluminum, and that probably will have more to do with keeping them viable under these circumstances than anything else, and that is a winner all the way around, it seems to me.

Dr. **Anderson**. Yes, Senator. The numbers that I referred to in my testimony were not our projections, and I should have clarified that. They are projections of the utilities, and what they simply say is, and we submitted it to this committee in much more detail last July on the series of hearings on the future capacity needs, but we simply point out that utilities themselves say that there will be reserve margins in excess of 25 percent in 1994 on a national basis. On a regional basis, we do not see problems. We also have tested these numbers. It is a very simple test, but we put them under alternative assumptions that are included in the testimony, and it does highlight the point that you just made that load growth has to nearly double before there is going to be a crisis situation, most situations, and I do not see that happening for the reasons I spent some time on.

Senator **Evans**. Mr. Faden, it seems to me one of the questions that has been sort of lurking at the fringes of all of the testimony today but has never been dealt with openly and directly is the question of citizen participation and when it should occur, how it should occur, and how many times it should occur. There are those who suggest that currently one of the major reasons for delay, maybe excessive delay, in carrying through a powerplant from beginning to end, is the repetitive opportunities for citizen participation, and frankly, for some of those who oppose nuclear power entirely, to insert delay in the hopes of killing the plants.

Do you think that is accurate?

Mr. **Faden**. No; I do not, Senator. I am glad you raised it, because it indeed has been lurking all around this issue today, and I do not think it is accurate at all, nor do I think there has ever been an independent study that has shown that. Even if you look at some of the studies that have been put forth by the industry witnesses today, you will notice they speak in terms of the regulatory structure rather than the process. It is very fuzzy what the 70 percent of the time or 75 percent of the time extensions are really attributed to.

I think this idea of intervenors out there having repetitive chances to kill or delay plants is largely a myth. It is first of all very difficult to get into the intervention process. It costs a lot of either time or money. It is very difficult to reraise issues. The NRC's licensing boards are very strict about what contentions they will admit. You hear a lot of people—industry spokesmen will bring in examples of very flaky issues, flaky contentions. What they do not usually mention is that these contentions were proposed by someone, but not admitted into the proceeding, so that they really did not add any time to the process at all.

What you have instead is a long record over the past 20 years of legitimate safety issues brought in by intervenors oftentimes when the NRC staff said that they really did not exist and they turned out to exist after all, and eventually have saved everybody, consumers and the utilities themselves, a lot of money by catching things early on instead of after a plant begins operation.

Senator **Evans**. Would you say that a good share of those have been caused by the fact that we seem to start plants shortly after we put the first pencil to paper, and have not fully designed plants before we start?

Mr. **Faden**. That is at least the biggest factor, and it comes close to being the only one. If we only had a complete design up front—I agree with everything that has been said today about the virtues of a complete design. Almost all the problems that we have seen, the major problems in this industry would have been avoided if there had been a design not just to look at and review, but for the builders to use starting from day one.

Senator **Evans**. You mentioned the need for a further citizen involvement after construction and prior to operation, and as I understood, at least, your testimony you would oppose the sort of combined construction permit and operating license being granted at the same time. Is that correct?

Mr. **Faden**. That is correct.

Senator **Evans**. If we pass legislation that adequately did provide for full standardization and a complete design, so that you are satisfied that it was explicit and complete and once approved could be replicated a number of times, it is really necessary then to have these other elements reviewed later that you suggested, and I know you mentioned a couple, quality assurance. Does that require any more than just a certification by the Nuclear Regulatory Commission or whoever is charged with that responsibility saying, Yes; that has been, the plant has been prepared and carried out according to the design which has been approved?

Is it really necessary to have that done later on, subjected to another set of public hearings where the people who appear are likely to have any significant information on quality assurance, any more, certainly, than the Commission itself? And I would just add to that the other one that you mentioned specifically, the emergency preparedness. Are we not able at the time of application for a final design permit and construction permit and operating license at that point if you know everything about the site-specific nature of the design and you know all about the design, so you know where it is going to be built, how it is going to be built, what all of the critical elements are, should you not also at that time be able to set forth a specific emergency preparedness plan and not have to review it later?

Mr. **Faden**. Those are both major issues. Let me start with quality assurance and go back to emergency preparedness. On quality assurance, the record of more or less the past decade has been replete with a number of major cases where, in fact, the NRC staff had put their stamp of approval on the plant, and then citizen intervenors, sometimes whistle-blowers, have brought in information which has led to a reopening of the case and a lot of work being done.

Diablo Canyon was one major example. The Zimmer plant, which was ultimately canceled, not as somebody—I cannot remember which witness, earlier, said because of a failure of process. It was canceled because they could not testify, they could not prove that that plant was built according to its design.

Senator **Evans**. Well, is not a good share of that simply the fact that they were designing as they went, and in some cases just simply could not provide all the paper work to assure that what had actually been carried out coincided with the final design as it was prepared?

Mr. **Faden**. Well, it was because they were designing as they went along, but it was not a paperwork problem, but paperwork is the only way of telling that that plant is OK, because no one, either the NRC nor the utility, has the manpower to go out and check every weld on every pipe. They have to rely on the paperwork.

Senator **Evans**. But that is certainly another hearing coming along at the end. It would not be any better, either, at doing that same thing.

Mr. **Faden**. But it was in that hearing and the discovery that preceded it that brought out this failure, and the same at Commanche Peak. You would have had there two, and along with Diablo Canyon, three unsafe plants going on line, plants that required extensive reworking. The NRC finally admitted they needed the extensive rework.

Senator **Evans**. And just take those two cases. How was that discovered?

Mr. **Faden**. It was discovered almost completely through the efforts of outside forces, private citizen intervenors, and whistleblowers, former employees.

Senator **Evans**. Well, let us start with—the outside citizens could not have had any significant information, specific information on the deficiencies in the plant presumably?

Mr. **Faden**. Well, they were able to find them simply through the discovery process.

Senator **Evans**. How did they find them?

Mr. **Faden**. Through the discovery process.

Senator **Evans**. But through the discovery process—is it not accurate to say that it is almost entirely through whistleblowers?

Mr. **Faden**. A lot of it was, but a lot of it also was analysis by citizens who knew enough to know what they were looking for, who went out and found the discrepancies that the NRC staff had somehow missed.

Senator **Evans**. What you are suggesting is that we ought to hire them to be the NRC staff.

Mr. **Faden**. In some cases, yes.

Senator **Evans**. Well, we could get into an endless round of that kind of thing and never reach a conclusion. I think it is very important that whistleblowers blow whistles. I am always distressed, however, that there is plenty of opportunity to blow the same whistle in the process. As it goes along, you can do it early on and do it through channels and that never seems to happen, or at least it does not happen frequently enough, and frankly, that is why I have mixed feelings about whistleblowers.

Mr. **Faden**. Well, I think it happens oftentimes and does not get taken seriously. The Chairman of the NRC's licensing board compared the final hearing to a final exam, and you prepare if you know that final exam is coming. If it does not happen at the end of the course, you tend to slack off. We think that is exactly what would happen if you removed that preoperational hearing. We are not saying we litigate. We are not saying we litigate anything that was decided before, and if you have had a complete design up front, and have had an opportunity to litigate all of the design issues, then the only way a design issue should come in at the back end is if there is substantial new information, and that is a pretty high standard. But we think there are issues, and quality assurance being the foremost, that can only be judged at the back end of the process.

Senator EVANS. How does that really differ from the bill, what the bill actually does.

Mr. FADEN. The bill really in a fairly artful legal way puts those issues solely in the discretion of the NRC, essentially the NRC staff, and makes a public hearing optional. It makes it in their discretion whether or not to hold the public hearing, which now is a legal right.

Let me come back to emergency preparedness also. You had brought that up earlier. That is one, we think, where a lot of the issues should be decided at the front end. As you say, a lot of them have to do with site selection and ought to be examined before anything, before any ground is broken. That was not done in the last generation of plants, and we are paying the price, particularly in cases like Shoreham on Long Island. I do not think that mistake will be made next time around. To us, the majority of the emergency preparedness issues can be dealt with at the construction permit or the first stage, but not all of them.

Senator EVANS. All right, then I guess you have to be more specific. Which ones cannot?

Mr. FADEN. The ones that cannot have to do with readiness of the outside actors, the local police, fire, ambulance, whatever, the degree to which they are truly prepared to act, and you cannot judge that 6 or 8 or 10 years before the fact.

Senator EVANS. Cannot you state what the requirements are, and make as a proviso that those ought to be set forth and accomplished at the time the plant opens?

Mr. FADEN. Well, you can do that, but the question is, who judges whether they are accomplished. Again, there is a need for an outside independent party and the NRC's hearing board to judge in the cases of dispute whether they are accomplished.

Senator EVANS. Well, does that require a whole other set of public hearings? I mean, it seems to me that when you have very specific kinds of requirements, and you have standardized designs, and you try to eliminate all of these problems beforehand, and we set up the requirements which must be met, that it does not take a whole other set of public hearings to determine whether that has been met or not. There you have a circumstance where as long as the requirements are explicit and straightforward, and that it seems to me is the critical part of any kind of proposed legislation, that at some point you have got to have a sufficiently competent review group and be willing to accept that.

Mr. FADEN. I wish I could agree with you, but the record on the NRC and FEMA——

Senator EVANS. I am not talking about the past. I am talking about the future.

Mr. FADEN. Well, our only clues to what will happen in the future is the record, and NRC and FEMA's record on this issue has been pretty spotty.

Senator EVANS. Well, that may be true. We could get into a lot of discussions about, you know, if history, and we always believe that we ought to remember history, but if we slavishly follow it without any recognition that we can change things, we would be in pretty sad shape today, and I do not think in any respect that we have, that the places where we made spectacular progress has usually come because we recognize history, but we are also willing to break away from some of our procedures of the past.

Mr. **Faden**. I think that is right.

I would just close this issue by saying that this is one of these cases where you have an administrative agency which often times can get fairly complacent, and you need a bit of an outside check on it that is accessible to ordinary citizens and State and local governments, and that is what the hearing process has provided.

Senator **Evans**. Do you believe, and I would ask each of you the same question I have asked before, whether you have any views as to the Nuclear Regulatory Commission itself just in functioning, and my question has never been aimed at any particular members of the Commission or anything else, but it is at the structure itself.

I do not know if all three of you were here earlier. If you were, then I will not repeat the question. What are your views on a single managed agency versus the current Commission? Dr. Anderson.

Dr. **Anderson**. I really am not qualified to address it. I must say that I was very impressed to hear the existing Commissioners all unanimous in agreeing with your question, and that is that that is very persuasive, but I just at this point cannot comment on it.

Mr. **Siebert**. Senator, NAM has not taken a position on that question either.

Mr. **Faden**. Senator, once again, we are the dissenters. We think although there are certainly problems there are benefits to be had from a multimember Commission, but more fundamentally we do not think organizational structure is the issue. We think the Commission's current problems have much more to do with their attitude, which is one, at least, of a majority of the members being deathly afraid that something they do will kill the industry. Thus they walk on eggs constantly and are afraid to even debate issues in public, let alone make tough decisions. We think you as a Senator have seen enough instances of single administrator agencies, EPA in the early part of this decade, NASA recently, which have not functioned at the level you should expect, and so we do not think it is a magic cure to turn it from a multimember to a single-member body.

Senator **Evans**. Do you think there are some particular benefits to a five-person headless agency? And I say that advisedly, because I think the chairman would be the first to agree that he has no great power as chairman.

Mr. **Faden**. Well, he has got more power than he has used, and I think a strong chairman can do things to get the agency moving without trampling on the rights of the other members. We think the benefits of having a multimember body have to do with increased public openness and increased ability to hear different points of view and increased flow of information both ways.

Senator **Evans**. Do you think the current rules that have got ten them to the point where they feel at least that they have got to go to the bathroom sequentially because no two of them can be found in the same place at any one time, is that appropriate?

Mr. FADEN. Well, I think there has been a lot of exaggeration of the effects of the current rules. They can do anything collegially except make an agency decision and talk about it. They can get together to informally talk about what is wrong with the nuclear industry. They just cannot get together and make decisions. That has to be done in public. And along with Commissioner Asseltine, we do not see why they are so afraid of discussing these issues in public.

Senator EVANS. Well, and of course I do not, either. I think there are a good many things that we ought to do in public. That is the way we built the Pacific Northwest Power Plan. The very first thing we did was talk about the problems of—just at the very first tossing ideas off the wall and getting into all sorts of ridiculous ideas, until we sorted things down and got more serious, and they said, we cannot possibly do all of that in public, and finally somebody said, why not? And so we did, and had very little difficulty from that process. But it seems to me that they are captured by far more than that. Apparently, and it seems to come from their legal counsels, because there are lots of them who just advise them that they really cannot—they cannot do that kind of talking. They cannot even discuss things together, much less—and of course they should not make decisions privately, but they cannot even discuss things together.

Mr. FADEN. Well, here again, I think that has been quite exaggerated. The numbers show that they go into executive session, I think, more than any other multimember Federal agency, and if my memory is correct, about twice as much as the average. There are 10 exceptions to the Sunshine Act, and they use them all very frequently.

Senator EVANS. Well, does that suggest that if they are doing that legitimately, that there is a lot of activity that is either proprietary or for whatever other reason is subject to a private meeting, and if that is the case, maybe they should spend more time in private rather than public, but you think there is a distinct advantage in five versus one? There is no magic in either one, necessarily?

Mr. FADEN. No, and this is an industry and a technology that is particularly under public scrutiny. The public gets very upset if they think things are being done that they do not know about vis-a-vis nuclear power. The proposed rule change, it wasn't a proposed rule change, but the actual rule change they passed last year on the Sunshine Act generated more comment and more editorial criticism than any other single action they have taken in at least this decade, and to our mind it was among the least significant safetywise of the actions they have taken. But the public is very upset when they think something that could affect them this heavily is being done behind closed doors.

Senator EVANS. Well, one thing you can be sure of, if you had a single member, he could not consult with anybody else behind closed doors.

Mr. FADEN. There is one other point to be made, Senator, on the single member issue, which is, it is a two-edged sword, depending upon who is President and who is appointing that administrator.

Senator **Evans**. And it seems to me that the corollary to that is, if you have a new President who is devoted to really trying to radically improve the nuclear industry, and is faced with the better part of a first term with an inability to move because a majority of the Commission are holdovers from a previous administration, that does not give the people a chance to see, and that may be the major policy that elected a President, and he would be incapable of acting simply because the holdovers might feel something different.

Mr. **Faden**. I think that is exactly right. That is what makes it a fairly tough call. You really are trading off responsiveness for stability.

Senator **Evans**. I guess from my own experience in 12 years as Governor I hold to the Abraham Lincoln view of appointments, that for each one you have 1 ingrate and 10 enemies, and I think that if you had fewer appointments, we might have fewer enemies and fewer ingrates.

There may be other written questions that other members of the committee will want to submit to you, and I know there are two or three here that I would like to have submitted.

But rather than keep you any longer this afternoon, I have appreciated this opportunity very much. I suspect it will not be the last hearing until we get to the opportunity to mark up any such legislation, and of course I think as everyone knows this is an effort that will draw heavily on both Committees of Environment and Public Works and Energy and Natural Resources Committee.

And so we thank you for your participation. The hearing is adjourned.

[Whereupon, at 3 p.m., the hearing was adjourned.]

APPENDIX

RESPONSES TO ADDITIONAL COMMITTEE QUESTIONS

Department of Energy
Washington, DC 20585

June 11, 1986

Honorable James A. McClure
Chairman, Committee on Energy
and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

On April 22, 1986, Secretary John S. Herrington appeared before the Committee on Energy and Natural Resources to discuss S. 2073, Nuclear Facility Standardization Act of 1986.

Following that hearing, you submitted written questions for our response to supplement the record. Enclosed are the answers to those questions, which also have been sent directly to the Committee staff.

If you have any questions, please have your staff call Mike Gilmore or Cathy Hamilton on 252-4277. They will be happy to assist.

Sincerely,

Robert G. Rabben
Assistant General Counsel
for Legislation

Enclosure

POST-HEARING QUESTIONS AND ANSWERS
RELATING TO THE
APRIL 22, 1986 HEARING
BEFORE THE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

WITNESS: JOHN S. HERRINGTON
SECRETARY OF ENERGY

QUESTIONS FROM CHAIRMAN JAMES A. MCCLURE

Question 1: How do domestic nuclear plant costs and construction times compare with the French experience? The Japanese experience?

Answer: In France, the cost of nuclear generating units coming on line in 1984 and 1985 ranged from $800 to $1,100 per installed kilowatt; the construction time for recent plants in France ranged from 5 to 7 years.

In Japan, for nuclear generating units coming on line during the same time period, the cost ranged from $1,100 to $1,800 per installed kilowatt. The construction period for recent Japanese plants has ranged from 4 to 7 years.

In the United States, plants which were completed in the early 1980's had capital costs ranging from $800 to $1,800 per kilowatt and an average construction time of 7 to 8 years, or in the same general range as those in France and Japan. However, United States plants coming on line in the same time period as the French and Japanese plants (1984/1985) had costs of $1,700 to $3,900 per kilowatt (and construction times of 8 to 16 years).

The problems of the U.S. nuclear industry result from a decade of changes in economic and regulatory forces which

Answer 1 (continued): severely complicated the management of nuclear power projects. The nuclear powerplants built in the 1960s and 1970s have generally had favorable economic and operating records, indicating that the technology for nuclear power is not the intrinsic problem. Inflation and recession combined to lower dramatically electrical demand and raise the cost of raising capital; and utilities, having planned for more electrical capacity than was needed, extended the schedules for new plant completions increased costs. Safety and environmental concerns exacerbated by the Three Mile Island accident inspired numerous new Federal regulations which extended plant construction times and increased costs. Finally, utilities had difficulty raising sufficient capital because State Public Utility Commissions were caught between consumer pressures to hold down rates and utility requirements for higher rates to complete new projects.

QUESTIONS FROM CHAIRMAN JAMES A. MCCLURE

Question 2: What is the status of progress in this country with respect to standardization of nuclear plant designs, pre-approval of sites, and controlled backfitting? How does this compare with similar progress in other countries?

Answer: There has been little progress made in the U.S. on standardization of nuclear plant designs. A number of the nuclear suppliers have standardized designs that have been submitted to the Nuclear Regulatory Commission (NRC) for review. However, none of these standardized designs have been approved by the NRC.

General Electric attempted for 13 years to obtain NRC certification of its standardized GESSAR II reactor design. During this 13-year period, the NRC staff required numerous changes that were subsequently made by General Electric to meet NRC's evolving safety standards. After completion of the staff review, the NRC Advisory Committee on Reactor Safeguards in January 1986 recommended yet more changes. This resulted in General Electric requesting that no further action be taken by the NRC on its GESSAR II application.

Moreover, prior to the recent Nuclear Regulatory Commission (NRC) backfit rule, the "after-the-fact" backfits designed to resolve outstanding safety issues were applied on a plant specific basis, which had the result of further deviating

Answer 2 (continued):

from a fixed or standard design. The NRC has attempted to change the regulatory process (section 50.4 of title 10, Code of Federal Regulations) but the process of design and regulate as-you-go is so entrenched that the process has proven to be ineffective. Enactment of standardization legislation is needed to provide a new framework to mandate corrections to this situation.

NRC recently adopted a backfit rule that in certain circumstances calls for a cost-benefit analysis of proposed backfits; an action that should improve the past inefficient and undisciplined process for dictating backfitting requirements. A clear distinction should be made between changes required to assure a minimum level of safety and those which improve safety margins. The former must and will be made without regard to cost or schedule impacts and the DOE bill does not change this; the latter is subject to the NRC backfit process, which now requires a central review process and criteria which must be met prior to NRC ordering their incorporation.

In terms of siting, the U.S. has not used pre-approval of sites because the request for site approval has to accompany the utility's request for a construction permit.

Answer 2
(continued):

France adopted a standardization policy in 1975 focusing on pressurized water reactors. Between 1976 and 1985, thirty-two 900 megawatt electric (MWe) units having essentially identical nuclear islands were built. In addition, four 1,300 MWe units were completed and sixteen more units of this design are under construction. An important element of this policy is that each equipment supplier receives orders for a complete series of plants with the obligation to use the same subcontractors. France has used "site banking," or a form of early site approval, for most of their plants prior to the submittal of an application to build the plant.

Japan has less standardization than France but more than that in the United States. After the initial construction program involving different plant designs, Japan is now building a series of units to achieve the benefits of standardization.

Future construction will also be based on standardized designs. Japan has early site approval and it is the first aspect of a single licensing process. Data on siting safety, including an environmental impact statement, is filed and public hearings held on the siting plan and local approval sought. This determination is made prior to entering into the rest of the licensing process.

Answer 2 (continued): Backfitting has not been a major issue in France or Japan. While backfitting can and does occur, the use of standard designs has meant that new regulatory requirements, developed since approval of a particular standard design, are normally applied to the next generation plant and backfitting is not done. However, when a significant safety issue is involved, the fact that a series of plants of the same generation are involved means that only one backfit analysis is necessary instead of many plant specific analyses.

QUESTIONS FROM CHAIRMAN JAMES A. MCCLURE

Question 3: Please respond to the comments made by Commissioner Asselstine in his letter that is attached to the NRC testimony provided for our 4/22 hearing.

Answer: There are twelve issues we identified that touch on the Administration's bill in some manner. They are:

1. Review of new issues prior to commencement of operations.
2. High threshold for hearings at operations stage.
3. Potential for startup prior to completion of hearings.
4. Questionable backfitting provisions.
5. Use of overall safety as the backfit standard.
6. The safety standards for COL should be the same as for plants licensed under the present regulatory scheme.
7. No opportunity for hearing on emergency planning.
8. Adequacy of plant construction and readiness for operation.
9. Use of essentially complete designs.
10. Use designs that incorporate larger margins of safety.
11. Resolution of USI's and generic safety issues.
12. Development of standards for utility management.

These issues are discussed in detail below.

Answer 3
(continued):

1. Review of new issues prior to commencement of operations.

Statement in Letter

> "It is worth noting that in 1983 the Commission recommended that it be required to conduct a supplemental review, prior to the commencement of operation, of any issues that were not considered in prior reviews of the facility. I see no basis to support the Commission's change in position on this important safety requirement. The DOE bill also suffers from this failure to require preoperational reviews of key safety issues by the NRC."

Recommendation

Key safety issues must be resolved before construction is allowed to begin. New issues about the design should be considered in connection with a hearing on the design. New issues about the site should be considered prior to operation.

DOE Comment

One of the criticisms often made about the current licensing process is that rules and requirements of the Commission, or their interpretation, can change after a utility has begun construction. This process can lead to costly design or construction modifications. For considerations of future plant orders, the uncertainty of this ad hoc process has led utilities to state that the risk in the regulatory process is too great for nuclear powerplants to be a serious contender. To correct this

Answer 3
(continued):

problem in the current process, S. 2073 would require decisions to be made early, prior to start of construction. The use of standardized designs, that have nearly complete design information available, will allow NRC to make its required finding that the facility can operate without undue risk to the health and safety of the public. If key safety decisions are made early in the process, as both the DOE and NRC bills require, what must follow then is an audit function by the NRC that the licensee constructed the plant and implemented other conditions as required by the license. Should the licensee not comply in some area, NRC's continuing audit review then has the responsibility to require modifications or changes to achieve compliance. (Contrary to what is sometimes claimed, changes required by NRC to achieve compliance with the requirements of the license are not backfits and need not be subject to the backfit provisions of the DOE bill.) If a supplemental review were used, there would be a tendency to put off resolution of tough issues to a later date or to reopen issues. One complaint currently made is that a different reviewer has responsibility at the second review and does not feel bound by previous decisions. A supplemental review at the operating stage would in essence be a continuation of the two-step current process. It is the

Answer 3 (continued): instability of that process that the S. 2073 would correct.

2. High threshold for hearings at operations stage.

Statement in Letter

> "The Commission's 1985 bill would place a very high threshold on the ability of a member of the public to obtain a hearing after the issuance of the combined CP/OL...(t)he DOE bill imposes a similarly high threshold for public hearings..."

Recommendation

The burden for coming forward with a new issue should recognize the opportunities given to raise such issues at an earlier, more appropriate time.

DOE Comment

The conditions for holding a hearing after construction of a plant and prior to operation are simply, and we believe fairly, that a new substantive safety issue(s) must be established.

Once the NRC has decided to grant a construction and operating license to a utility, the burden shifts to those who wish to raise new concerns to prove the issue is new and has a substantive effect. As long as the public has had a full opportunity to be heard and

Answer 3 (continued): safety issues are completely resolved before construction is allowed to begin, then in all fairness, the rights and investment of the utilities and its ratepayers should be considered and protected.

3. Potential for startup prior to completion of hearings.

Statement in Letter

> The DOE bill "would expressly allow plant startup prior to completion of hearings on significant safety issues."

Recommendation

The Commission should have the authority to decide if any issues have been raised which should preclude plant startup even though a combined construction and operating license has been granted.

DOE Comment

Commissioner Asselstine implies that facility startup is automatic even if a hearing has been ordered. This is not the case. The Commission must make a specific determination to allow startup based on assuring that public health and safety can be maintained. It is possible that an issue for a hearing could be raised which would have no impact on the initial startup phases of the plant. For example, if a dispute arose over the

Answer 3 (continued): training needed by the crew for handling irradiated fuel during refueling in order to assure a fuel handling accident were avoided, resolution of the issue need not holdup initial plant startup. Refueling would not occur until 12 months or more after startup. The NRC should have flexibility to make such a determination so as to avoid unnecessary costs to the licensee and delays in operation schedule.

4. Questionable backfitting provisions.

Statement in Letter

> "If this formulation (on backfitting) turns out to be unworkable and detrimental to safety, the regulations could be modified relatively easily. A statute would be far more difficult to amend (and) the DOE bill would freeze by statute these questionable provisions of the Commission's current backfit rule."

Recommendation

Statutory provisions on backfitting would be beneficial to both the NRC and the industry by providing stability and predictability in the licensing process.

DOE Comment

That the existing process needs to be overhauled legislatively is evident by examining the present controversy over NRC's backfit rule. The Union of

Answer 3 (continued):

Concerned Scientists (UCS) has challenged the backfit rule on the grounds that the Atomic Energy Act forbids the consideration of economic costs in the backfit process, because the rule permits cost factors to be given undue weight, is arbitrary and capricious because it fails to mandate consideration of certain classes of benefits, uses unreliable probabilistic risk analyses for safety decisions, and violates procedural requirements of the Atomic Energy Act. The primary issue missed by the UCS is that there should be a clear distinction made between those changes that are required to comply with NRC rules and regulations and those which would improve safety. The former must be ordered without regard to their schedule or cost impact. The latter can and should be evaluated on their merits, including cost, as required in the NRC backfit rule and the DOE legislation.

Legislation is needed to insure that the intent of the Atomic Energy Act and the NRC backfit rule are clearly stated by Congress.

5. Use of overall safety as the backfit standard.

Statement in Letter

> "Putting aside my reservations about the Commission's proposed backfitting standard (conditioning a backfit on showing that it

Answer 3
(continued):

will substantially advance public health and safety by improving overall plant safety)..."

Recommendation

The Commission, in all its actions, needs to draw a clear distinction about which of its actions are taken to achieve compliance with a license (such actions not subject to backfit rule) and which actions are taken to improve safety above the agreed-upon base established by the license. For actions to improve safety, the improvement should be a significant increase using a variety of factors to determine if it is cost effective to do so.

DOE Comment

Backfits typically require changes to equipment, operating procedures, maintenance procedures, and reporting. They can be costly. Therefore, when a modification is made that goes beyond the NRC's minimum standards for safety the resulting benefit should be worth the time, trouble, and expense incurred to make those changes. As a result, we propose in our legislation and support the NRC in its backfit rule that the safety improvements be significant. In order to help determine what is significant, S. 2073 lists evaluation factors to be used including cost and consideration of

Answer 3 (continued): reduced occupational radiation exposure to workers.

6. The safety standards for COL should be the same as for plants licensed under the present regulatory scheme.

Statement in Letter

> "...plants with combined CP/OL's (should) meet the same safety standards as plants licensed under the present regulatory scheme..."

Recommendation

We can and should do better than that allowed under the existing scheme.

DOE Comment

The revised licensing process will result in an improvement of safety for future plants. Making early decisions with essentially complete designs, focusing of industry and NRC resources on a few designs as opposed to today's situation of many one-of-a-kind designs, acquisition of construction experience from plant to plant to assure high quality construction and transfer of operating experience between standardized plants are some of the contributing factors.

While the proposed process would result in improvements in the level of safety and all the same safety standards would be met when the plant begins operation, this

Answer 3 (continued): does not mean that all of the information presently included in an Final Safety Analysis Report (FSAR) must be in the Safety Analysis Report for obtaining a COL. For example, one item in Reg. Guide 1.70 deals with environmental qualification of equipment and requires that actual test data from such equipment qualification tests be provided in the FSAR. At the time of issuance of the COL some equipment in the plant may not be fully specified. However, the performance requirements, tests, and inspections to be used when doing the actual qualification tests can be provided, reviewed by NRC, covered in a hearing, and a determination made that they are adequate. Confirmation that the equipment has been properly qualified, including actual tests results, would be part of the normal NRC audit process during construction. This general approach is equivalent (and in many ways superior) to the present approach and can allow the Commission to make its finding that there is no undue risk to public health and safety.

7. No opportunity for hearing on emergency planning.

Statement in Letter

> "As a practical matter, this thicket of obstacles will make it impossible for people living close to a plant to obtain a hearing on the issues such as emergency planning...(t)he

Answer 3 (continued):

> Commission and DOE proposals should "afford interested states and members of the public an opportunity for a hearing prior to plant operation on issues such as emergency planning..."

Recommendation

All issues related to emergency planning, such as the feasibility of evacuation should be resolved by the time of COL issuance. A followup audit by NRC and an opportunity for a hearing will be provided if the utility does not satisfy its commitments.

DOE Comment

Key emergency planning issues can be resolved prior to start of construction. The existence of a plant is not critical to the development of a plan; rather the hazards associated with the plant and the notification and communication requirements, etc. must be established. Since sufficient information on the design and site must be available to allow the Commission to issue a construction and operating license, the information needed to prepare the emergency plan will be available and key emergency planning issues can be resolved. This includes a full public hearing.

Answer 3 (continued): The fact that there is a time gap between resolution of issues and start of construction is not a valid objection since an emergency plan must be acceptable throughout its 40-year lifetime. Whatever provisions are necessary to make it acceptable for 40 years can also be effective for the 6 or so extra years for construction.

The NRC would have the responsibility to audit the implementation of the emergency plan including emergency plan exercises. As long as the licensee satisfactorily complies with all requirements, it should be allowed to operate. Provisions are included in the proposed legislation for requesting a hearing at the preoperation stage that would include issues on emergency planning. The thresholds for admitting contentions are believed to allow a balanced consideration of the rights and investment of the utilities and its ratepayers with those who may wish to raise safety concerns.

8. Adequacy of plant construction and readiness for operation.

Statement in Letter

> "The Commission and DOE proposals should...afford interested states and members of the public an opportunity prior to plant operation on (the)

Answer 3 (continued):

> adequacy of plant construction and readiness for operation."

Recommendation

Develop and use a "sign-as-you-go" approach for assuring construction quality and provide an opportunity for a hearing for instances of non-compliance.

DOE Comment

One of the important aspects of the Administration bill is a requirement that before a construction and operating license is granted a detailed construction plan must be prepared and fully considered. This plan would include a determination of the necessary inspections, the timing of such inspections in the construction process, the criteria to be used for such inspections, and sign-off authorities and responsibilities. This type of process has not been required or used in the past. If such a plan has been prepared, reviewed, and approved by NRC and subject to a full public hearing, then compliance with the plan, as attested to by the NRC sign-off process, should be sufficient to allow the licensee to proceed. To allow re-examination by the public at this stage as to what constitutes adequacy of plant construction and readiness for operation, after such issues have already been thoroughly reviewed, including a public hearing,

Answer 3
(continued): does not give adequate protection to the rights of the licensee. If there is evidence of non-compliance, besides the actions that NRC would take, there is an opportunity to request a public hearing.

9. Use of essentially complete designs.

Statement in Letter

> Add "provisions to the bill to require that future nuclear powerplant applications use essentially complete standardized designs..."

Recommendation

We agree with this provision.

DOE Comment

(See response to question number 5).

10. Use designs that incorporate larger margins of safety.

Statement in Letter

> Add "provisions to the bill to require designs which incorporate as key design elements...larger margins of safety."

Answer 3 (continued):

Recommendation

The Administration's bill will provide the incentive for the industry to pursue designs with enhanced safety features.

DOE Comment

The Department in cooperation with nuclear industry is developing advanced designs that will achieve larger margins of safety. In some designs, the use of more passive features will contribute to this goal. This includes enhancements in natural circulation capability and less dependency on emergency power and other engineered safety features. Features are being added that will significantly lower the core melt probability. Improved control systems and transmission of data are being worked on as well as improvements in constructing these plants.

11. Resolution of USI's and generic safety issues.

Statement in Letter

> "The bill should require that any future design or plant application satisfactorily resolve all existing safety questions including the unresolved and generic issues..."

Recommendation

We agree with this statement.

Answer 3 (continued):

DOE Comment

The Administration's bill is forward-looking, requiring that all safety issues be resolved in the design of the future generation of advanced light water reactors and prior to the issuance of a construction and operating license.

The NRC has a program to resolve generic safety issues affecting the current generation of plants. The Administration's bill would make it possible to introduce a new generation of light water reactors whose designs already resolve the issues which have troubled present designs, without waiting for final action by the NRC and industry on existing plants.

12. Development of standards for utility management.

Statement in Letter

> "I would require that the NRC develop standards for utility management and that the utility applicant demonstrate that it has an experienced and competent management team in place before NRC approves start of construction."

Recommendation

We agree with this statement.

Answer 3 (continued):

DOE Comment

Section 103 of the Atomic Energy Act already implicitly requires that the NRC make a determination of management competency. The NRC determination should be made before construction is allowed to proceed.

QUESTIONS FROM CHAIRMAN JAMES A. MCCLURE

Question 4: Since standard designs are already available, at least of nuclear steam supply systems, why do we need legislation?

Answer: A number of the nuclear suppliers do have standard designs which they have submitted to NRC. However, none of these has been approved by the Commission through the rulemaking process for future use. A clear example of the problems faced by anyone attempting to get NRC certification of a standard design involves General Electric's efforts on its GESSAR II standardized design. During a period spanning 13 years of review by the NRC, the NRC required numerous changes. In spite of all the accommodations made by General Electric to meet NRC's evolving safety standards, the NRC's Advisory Committee on Reactor Safeguards, in a letter to the Commission dated January 14, 1986, recommended yet more changes. Subsequently, General Electric informed the NRC that it will expend no additional funds and desires no further review of or action on its GESSAR II application.

General Electric and NRC entered into this process in good faith and attempted, for an extended period of time, to use the existing "design-as-you-go," "regulate-as-you-go" process to get NRC's approval of a standardized design. They were unsuccessful. Legislation is needed to change the current

Answer 4 (continued):

"design-as-you-go," "regulate-as-you-go" process"--which was appropriate in earlier times to promote the civilian use of nuclear power, but which is fundamentally flawed given the current maturity of the industry based upon more than 30 years of experience. The current system does not have the discipline necessary to make the best safety related decisions, make them early in the process, and provide the public with the opportunity for an early review of safety related issues based upon more complete information.

QUESTIONS FROM CHAIRMAN JAMES A. MCCLURE

Question 5: How would you define a "standardized design?" How much of a nuclear plant can be standardized?

Answer: We agree with the following statement by the Union of Concerned Scientists' (UCS) on the need and purposes of standardization:

> There is no disagreement that standardization of nuclear powerplants--if properly implemented--would yield far more safety and cost benefits than the chaotic, one-of-a-kind, design-as-you-go system that we have had for the past two decades.*

Moreover, there is agreement that while the present system permits construction to begin with a design that is no greater than 15 to 25 percent complete. This process has thwarted realization of the benefits inherent in standardization.

The requirement for a fully complete, standardized design will require a heavy front-end investment. The proposed legislation would make this worthwhile to investors, regulators, and the public.

However, there is no agreement on an exact definition of how much and what is necessary to resolve safety issues in a

---

* Testimony of Michael E. Fadden, UCS Legislative Counsel, before the Senate Committee on Energy and Natural Resources, April 22, 1986.

Answer 5 (continued): design which can be used to build more than one plant, at more than one site.

The Atomic Industrial Forum calls for "...an essentially complete design (to the bid spec level)..." in their March 1986 Position Paper on Standardization. A group of public intervenor organizations advocated a "complete design" in their May 8, 1986, letter to Representative Markey.

Nuclear powerplants in total or in major subsystems parts can be standardized. The Administration believes that the legislation should provide guidelines for the NRC to specify detailed design content requirements through the rulemaking process. These guidelines are that the design be sufficiently complete to resolve safety issues, sufficiently flexible to be applicable to multiple sites, and certified for multiple use.

QUESTIONS FROM CHAIRMAN JAMES A. MCCLURE

Question 6: Is it true that the legislation would stifle, rather than enhance public participation in the licensing process?

Answer: To the contrary, the Administration's bill will provide public access at each step of the process, and more complete information in advance of each approval.

An opportunity for public hearings is provided on approval of standardized designs submitted to the Nuclear Regulatory Commission (NRC); a second opportunity is provided on the approval of sites for generating facilities and there is a third opportunity for public participation at the time of application by a utility for a combined construction permit/operating license (COL). Further, if new substantive issues affecting safety not previously raised in the licensing process are brought forward, the NRC can hold a hearing prior to actual operation of the plant. Accordingly, the Administration's bill will provide as many as four opportunities for public hearings prior to operation. The current process only provides two opportunities. S. 2073 would not change the opportunity to obtain a public hearing after plant operations have commenced.

Answer 6 (continued): We have attempted to provide the public with opportunities in the process when there is full information in each area and in advance of the NRC decision at each step. This should significantly enhance public participation over the current process where the public is involved too early--before significant design detail necessary to resolve the key safety issues is available--and too late--after construction is completed.

QUESTIONS FROM SENATOR J. BENNETT JOHNSTON

Question 7: Would this bill require that plants that receive a combined construction-operating permit meet the same standards as plants that receive a construction and operating permit under the present scheme?

Answer: The NRC standards for safety are established as a condition of license for each plant. We believe that a plant constructed on the basis of a combined construction and operating license would achieve an improved level of safety relative to the same plant built under the construction permit and operating license method. This is due to the fact that a well-developed design would be in-hand at the outset of construction, the safety-related features of the design would have been established, the resources of the applicant and the NRC could be concentrated on construction quality and design verification, the lessons learned from constructing standardized plants could be passed on to subsequent projects, and the operating experience gained from operating standardized designs could be readily shared.

QUESTIONS FROM SENATOR J. BENNETT JOHNSTON

Question 8: Would this bill guarantee persons living near a plant a hearing on adequacy of construction, readiness for operation and appropriateness of emergency planning before the plant operates?

If not, why not?

Answer: The DOE bill guarantees a hearing prior to plant operation on the adequacy of construction, readiness for operation, and the appropriateness of emergency planning if a substantive new safety issue emerges.

Early in the process when site selection is made, when the design is approved, and when the application to construct and operate a powerplant is made, the Administration bill would expand public participation by providing in advance more complete information on construction, operation, emergency planning, safety, the environment, and other important issues that concern the public.

Once a decision has been made to go forward with a construction project, the burden shifts to those who subsequently wish to raise safety concerns. As long as the public has had a full opportunity to be heard and issues are completely resolved before construction is allowed to begin, then in all fairness, the rights and investment of the

Answer 8 (continued): utilities and its ratepayers should be considered and protected after construction is completed.

It is a question of redressing timing and substance: the present system requires the public to get involved too early, before key safety issues are resolved, or too late, after all decisions and all construction are completed.

QUESTIONS FROM SENATOR J. BENNETT JOHNSTON

Question 9: What does this bill do to hasten resolution of the numerous outstanding specific and generic safety issues that are now unresolved and routinely deferred in the present licensing process?

Answer: The Administration's proposal is forward-looking, anticipating the resolution of safety issues and concerns before a construction and operating license (COL) is granted. However, resolufion of outstanding issues associated with the existing 100 or so plants would not be affected. This is because the legislation is directed at assuring a sound process for action on any future orders.

In order to receive a design approval or a COL from NRC, it will be necessary for an applicant to show and NRC to accept that the design resolves current unresolved and generic safety issues. One major thrust of the legislation is to achieve stability and predictability in the regulatory process by making key decisions early in the process. It would be inconsistent with this thrust to continue to have issues outstanding when granting design approvals or COL's.

The Department and the nuclear industry, through the Electric Power Research Institute (EPRI), are in the process of developing advanced light water reactors. These designs will

Answer 9 (continued): be robust from a safety standpoint, sound from an economic and performance standpoint, and will provide technology improvements such that plants of the future will not be saddled with problems of the past.

QUESTIONS FROM SENATOR J. BENNETT JOHNSTON

Question 10:	What would this bill do to shift the focus of licensing from a contest between lawyers to an engineering determination of safety?
Answer:	First of all, by introducing stability and predictability into the review and approval process, the bill serves to encourage and focus the technical community on developing advanced light water reactor projects addressing safety issues in the design and engineering of new technology. Secondly, by providing complete information in advance of approval of each step, substantive technical safety issues become the focus of hearings, restricting the need for and use of procedural delaying maneuvers by lawyers to the minimum.

QUESTIONS FROM SENATOR J. BENNETT JOHNSTON

Question 11:	Can the nuclear licensing process be reformed in an effective way without reforming the structure of the Commission? For example, shouldn't the agency have an administrator who is responsible to Congress and the President and who can manage the very large NRC staff?
Answer:	What is primarily needed is a fundamental change in the regulatory process. DOE believes this particular issue should be considered separately--in separate legislation--so as not to divert attention and resources from correcting a fundamentally-flawed regulatory process.

QUESTIONS FROM SENATOR J. BENNETT JOHNSTON

Question 12: What place does the collegial structure of the Commission have in determining matters of safety?

Answer: The collegial structure of the Commission does allow a diversity of opinion to be expressed at the final and highest level of NRC review. However, it takes place in an agency which has incorporated a multi-layered and adversarial hearing process. The critical issue, however, is not the structure of the Commission but that the current process was instituted to bring nuclear power into the commercial sector, and is ill-suited for a mature industry.

QUESTION FROM SENATOR J. BENNETT JOHNSTON

Question 13: What is your opinion of Senator Biden's suggestion, contained in the bill, S. 2291, he recently introduced, that an independent Nuclear Safety Board be established, which would review nuclear incidents and make determinations about scientific and engineering aspects of those incidents.

Answer: Although the question is specific to incident review and evaluation, S. 2291 has another purpose: "continual review and assessment of licensing and other regulatory practices of the NRC, which assessment may result in conclusions critical of the NRC or its officials." Both the incident review and this broader regulatory review are aimed at recommendations to the NRC on improvements in "licensing and related regulatory practices." The Board would be appointed by the President, with the advice and consent of the Senate. The Chairman would be the chief executive officer of the Board. Thus, the Board would have more of a line-type management structure than the NRC. S. 2291 would provide for regulation of the regulators and could result in potential conflict in Federal regulation of licensees. (The Safety Board could request utilities to provide incident data, a practice now established by NRC). NRC currently has the authority to order special reviews of significant nuclear accidents and this has been the norm. The legislation as proposed would seem to institutionalize a more complex tangle of Federal

Answer 13 (continued): oversight, would not be helpful to either the public or the industry. Focusing attention on management oversight diverts attention from the critical need to overhaul the "design-as-you-go," "regulate-as-you-go" process.

QUESTIONS FROM SENATOR J. BENNETT JOHNSTON

Question 14: Please provide the Committee with specific examples of backfitting at nuclear plants that you consider unnecessary or overly costly.

Answer: Utilities provided extensive information on the cost of backfits in response to a February 8, 1983, request from James R. Tourtellotte, Chairman of the NRC Regulatory Reform Task Force. A separate study performed for DOE in 1984 also provided many examples of problematic experiences with NRC backfitting procedures. Three specific examples are illustrative of problems in this area and are described below:

1. Changing Standards: Fire Protection and Security

When most plants were granted construction permits, the NRC allowed utilities wide latitude on means employed to prevent and combat fires. After the fire at Browns Ferry, the NRC issued new and specific standards. In the late 1970's, the NRC's requirements on fire protection (Branch Technical Position 9.5-1) gave the utilities the option of installing fixed suppression systems to protect against reactor coolant pump lubricant fires. The H. B. Robinson plant installed new systems, approved by the NRC staff in September 1980. In November 1980, the

Answer 14
(continued): Commission issued Appendix R which required installation of a different kind of system.

A second example of changing standards is in the area of security systems. A 1973 change in station security required Commonwealth Edison to provide a new gatehouse at the Dresden, Quad Cities, and Zion nuclear power plants to contain additional guard force and perimeter monitoring equipment, perimeter intrusion alarms, fenceline lighting to a defined minimum level, closed circuit television to monitor the perimeter fence, and a second monitoring station in the control room remote from the gatehouse, at a cost to each plant of $620,000. Further changes in the security rule agreed to by the Commission in 1977 cost the same plants another $7 million each, in addition to the cost of abandoning most of the equipment installed in 1973.

Varying standards can be more costly than complying with onerous but unchanging standards.

2. Changes that do not Significantly Enhance Safety

A systematic reevaluation of the Dresden-2 plant has shown that the plant "was all right to begin with," but only after 5 years of work, $2.6 million in studies,

Answer 14 (continued): and $1.3 million in backfitting both equipment and procedures. Despite a smooth-sailing review--which cost NRC $1.7 million--some 20 backfits were required as a result of the reassessment of Dresden-2. In a partial Probabilistic Risk Assessment (PRA) conducted by the NRC, none of the 20 backfits was found to have any relation to initiating a core-melt accident, considered the biggest risk to public health and safety. Only four were found to have any impact on averting such an event. The backfits were ordered regardless of the PRA findings.

A Sandia National Laboratory PRA showed that backfits required as a result of the systematic evaluation program at Northeast Utilities Millstone-1 would do little or nothing to lessen the plant's chances of having a core melt accident. The PRA also pointed out that the backfits would have an equally small effect on the expected exposure rates at the plant. Northeast Utilities spent about $3 million conducting the NRC-mandated Safety Evaluation Program (SEP) at Millstone-1. The hardware backfits attributable to the SEP cost the utilities $1.5 million and the NRC spent $600,000 overseeing the review.

Answer 14 (continued): 3. Regulatory Over-Reaction

Many operating plants and plants under construction had to make extensive and expensive backfits to meet requirements added to General Design Criteria (GDC)-4 to overcome perceived deficiencies in protection against dynamic effects of postulated pipe ruptures. This did not involve a true backfit, since the action was taken to achieve what was regarded as minimum levels of safety. However, the actions taken appeared to go beyond meeting minimum standards. A total of approximately 15,000 pipe whip supports were installed to meet the new NRC requirement. In NUREG 1061, NRC estimates costs of $20 to $40 million per unit for 250 to 400 supports per unit and 150,000 to 200,000 manhours per unit for the design, procurement, and construction of these supports. This amounts to over $6 billion for the 100 units now in operation when the additional cost of schedule delays, financing charges, and maintenance required for inservice inspection are included. In April 1986, the NRC published a modification of GDC-4 that allows use of leak-before-break technology for once again excluding from the design basis the dynamic effects of postulated ruptures in primary coolant loop piping in

Answer 14 (continued): pressurized water reactors. This means that the NRC once again recognizes that leakage from flawed pipes can be detected and the pipes repaired before a sudden rupture takes place, making unnecessary the use of many restraints and jet impingement shields to protect against the forces that would be associated with a pipe rupture.

Overall, savings of about $200 million are expected from removing unnecessary restraints and barriers at operating plants. Limiting the use of these structures also will reduce radiation exposures to workers who have to remove and replace them when performing inspections and will avoid safety hazards associated with improper placement of restraints.

QUESTIONS FROM SENATOR J. BENNETT JOHNSTON

Question 15: The March, 1985, report of the NRC Regulatory Reform Task Force found that

> "There is a substantial amount of evidence that the (NRC) Staff's backfitting practices which have cost consumers billions of dollars, have made nuclear plants more difficult to operate and maintain, have injected uncertainty and paralyzing delay into the administrative process, and in some instances may have reduced rather than enhance public safety."

Would you please comment on this report?

Answer: In general, we agree with most of the concerns addressed in this report. The backfit examples presented in this report appear to be representative of many costly backfits for which there is little or no documentation of actual improvements in overall plant safety.

In response to a congressional request, the NRC Regulatory Reform Task Force issued a report on NRC's interim backfitting and licensing practices affecting several plants, most notably the case of Duquesne Light Company. The report reviews the history of backfitting and discusses NRC's November 1984 proposed backfit rule. This report stated that Duquesne Light Company's problems were more generic than plant-specific and identified four key factors affecting the backfit problem--undisciplined approach, inadequate analysis, confusion over what is or is not a legal regulatory requirement, and general fairness. This showed that NRC was

Answer 15 (continued): not using the interim backfit procedures any better than the original backfit procedures.

In June 1985 and subsequent to issuing this report, the NRC Regulatory Reform Task Force submitted its proposal for a final backfit rule to the Commission for approval, based on the comments that had been received from the public, including DOE. The NRC's new backfit rule was issued in September 1985 and is now being implemented. The Administration's backfit provision is very similar to the new NRC backfit rule, which provides for a more disciplined management process and better criteria for evaluating the need for backfits which would enhance safety after a plant has satisfied NRC's standards.

QUESTION FROM SENATOR J. BENNETT JOHNSTON

Question 16: Please provide specific examples of the kind of unneeded backfitting that would not occur if this bill was enacted.

Answer: Unneeded backfits can be traced to the reliance on the basic process of design as you go, regulate as you go. When resolution of safety issues is allowed to be deferred, regulatory actions can take on a classic pattern of inaction and overreaction. The legislation should prevent repeats of the situation where the NRC required very little in the way of restraints and supports on pipes and equipment, then required extensive gear and finally adopted standards somewhere in between (as in the case of proposed action of General Design Criterion 4).

As important is the clear distinction that would be drawn between acceptable standards for safety (established when the license is granted) and backfits (cost beneficial enhancements to safety). The new licensing process would provide a logical framework to decide issues affecting public safety.

QUESTIONS FROM SENATOR DALE BUMPERS

Question 17:	In 1983, the NRC issued a report that listed 482 generic issues or "possible deficiencies in the design, construction or operation of several or a class of nuclear power plants such that the protection of the public from radiation may be inadequate." In 1984, the NRC reported that it had 12 more serious "unresolved safety issues," defined as issues that "pose important questions concerning the adequacy of existing safety requirements ... and that involve conditions not likely to be acceptable over the lifetime of the plants affected." The GAO has estimated that it will take the NRC about 10 years to eliminate the backlog of unresolved issues. Does the DOE bill require the resolution of these generic safety issues prior to the approval of a standardized plant design? If not, how does the standardized plant design concept advance the protection of the public health and safety beyond the present system?
Answer:	The Administration's bill is forward looking. It requires that all safety issues be resolved in the design of the future generation of advanced light water reactors and prior to the issuance of a construction and operating license. The NRC has a program to resolve generic safety issues affecting the current generation of plants. The Administration's bill would make it possible to introduce a new generation of light water reactors whose designs already resolve the issues which have troubled present designs, without waiting for final action by the NRC and industry on existing plants.

QUESTION FROM SENATOR WENDELL H. FORD

Question 18:	Can you cite two or three specific examples of nuclear powerplants that have completed construction on time and on budget within the last few years? For each example, please provide your opinion of what the main reasons for success were.
Answer:	No nuclear powerplants coming on line in the last few years have been completed on time and on budget. A number of units, however, have better than average records. The Saint Lucie 2 nuclear unit, which received its low power license in 1983, had a construction time of 5 years and 11 months (a record for plants licensed over the past 4 years) and a capital cost of $1766 per kilowatt. Other nuclear units with better than average records include Catawba 1 (9 years and 4 months and $1674 per kilowatt), Catawba 2 (10 years and 6 months and $1569 per kilowatt), Palo Verde 2 (9 years and 7 months and $1466 per kilowatt), McGuire 2 (10 years and 1 month and $838 per kilowatt based on a 2-unit station), and LaSalle County 2 (10 years and 3 months and $1110 per kilowatt based on a 2-unit station). Several factors have been identified as contributing to lower capital costs and shorter construction times. These include the experience by utilities involved in the construction of two similar nuclear units at the same site. Examples of such utilities are Duke Power in the case of Catawba 1 and 2 and McGuire 2 and Commonwealth Edison in the case of LaSalle County 2.

Answer 18 (continued): Commonwealth Edison's considerable experience has been acquired from its eight nuclear plants in commercial operation and its three units under construction. Another important factor which appears to lead to shorter construction time and lower costs is an experienced and aggressive utility management team.

QUESTION FROM SENATOR DANIEL J. EVANS

Question 19: Have you made any projections on the effect this legislation could have on the interval between initial construction and the commencement of plant operations? What might be the impact would have on the cost to utilities of building a nuclear plant? Would this dramatically increase the attractiveness of nuclear as a generating option?

Answer: By providing a process for preapproval of designs and sites, the utility can expect to reduce the lead time for new projects. The Department of Energy (DOE) has attempted to quantify the impact which such measures could have on nuclear construction time and capital costs (see chart). Once standardized designs are certified or are pre-approved for use by a utility, actual lead times from the decision that new capacity is needed to operation would be reduced by about 5 years. Standardization could reduce average capital costs by approximately 28%. While these are dramatic savings, nuclear licensing reform by itself, although necessary, may not be sufficient for the nuclear option to remain viable in the eyes of electric utilities. Other factors which a utility considers include the ability to raise capital at acceptable rates and earn a reasonable return on investment, and load growth projections which justify adding new generating capacity.

Expected Impact from Nuclear Licensing Reform *

Reform	Time Savings (months)	Cost Savings (%)
Early Site Permit	5.6	2.3
Preapproval of Design	8.4	7.1
Early Site Permit + Preapproval of Design	42.1	17.5
One-Step Licensing	-8.7	-1.6
Amendments and Variances--Part 1	5.0	1.5
Major Backfitting (Amendments and Variances -- Part 2)	24.0	16.1
Major Backfitting + Preapproval of Design	32.4	22.4
Hearings	2.6	0.8
Allocation of Resources	0.7	0.3
Major Backfitting + Preapproval of Design + Early Site Permit	66.0	28.0
Total Reform Package	64.3	28.1

*Base Case: 1139 MWe Light Water Reactor Power Plant with a time from decision to build to commercial operation of 180.2±13.8 months.

Source: Quantitative Analysis of Nuclear Power Plant Reform (LA-9519-MS), 9/82.

QUESTION FROM SENATOR DANIEL J. EVANS

Question 20: You argue in your testimony that both pre-approved designs and sites should remain valid for ten years. Would you preclude the NRC from reviewing and perhaps modifying their approvals before this time?

Answer: No, we would not. The Administration bill provides that the design approval may be modified in a design amendment proceeding if certain conditions are satisfied. The proposed modification would have to satisfy the requirements specified by section 187 of the Administration bill, the Modifications section (backfit section), and/or result from an issue which satisfied the threshold levels for admitting an issue into a design amendment proceeding as specified in section 193 of the bill, Approval of Standardized Designs.

QUESTION FROM SENATOR DANIEL J. EVANS

Question 21: With nuclear plants it would seem to be essential to fully coordinate and integrate the site and the generating facility. In the NRC hearings on a pre-approval of a site, would there be limits placed so that sites would be approved only for specific designs? What kind of adjustments would have to be made in the pre-approved design prior to the granting of the proposed Construction Permit and Operating License?

Answer: We agree that it is essential that any site used for a nuclear plant has to be fully compatible with one or more of any pre-approved standardized designs. Specific characteristics of standardized designs and sites would be defined when they were approved which would limit their ability to be matched with each other (e.g., cooling water capability at site would determine maximum size of plant which could be accommodated). The final showing that the combination of the site and plant design is sound and meets all applicable standards would take place early in the process, as a part of the NRC review of an application for a construction and operating license.

It is possible that certain kinds of pre-approved designs could not be used at some sites. For example, a plant designed for a 0.25g design basis earthquake requirement could not be used at a site which requires a plant having a 0.30g design basis earthquake. If none of the pre-approved plant designs are compatible with the selected site, then

Answer 21
(continued): either the site could not be used, a new plant design pre-approved, or the existing pre-approved plant design would have to be changed. However, it could only be changed under the specific conditions contained in the Administration bill. These specific conditions are:

1. satisfy the review process and acceptance criteria for backfits (Section 187, Modifications Section); and/or
2. satisfy the threshold necessary for issues to be admitted into a design amendment proceeding (Section 193, Approval of Standardized Design Section).

QUESTIONS FROM SENATOR DANIEL J. EVANS

Question 22:	Do the conditions placed upon re-opening the Combined Construction and Operating License prior to actual operation of a facility establish a "bar" to reviewing the license?
Answer:	The conditions for holding a hearing after construction of a plant and prior to operation are simply, and we believe fairly, that a new and substantive safety issue must be raised. Once the NRC has decided to grant a construction and operating license to a utility, the burden shifts to those who wish to raise new concerns to prove the issue is new and has a substantive effect. As long as the public has had a full opportunity to be heard and safety issues are completely resolved before construction is allowed to begin, then in all fairness, the rights and investment of the utilities and its ratepayers should be considered and protected. This condition is not a "bar" to resolving safety but it should be a "bar" to further, purely procedural delays.

JAMES A. McCLURE, IDAHO, CHAIRMAN

MARK O. HATFIELD, OREGON
LOWELL P. WEICKER, JR., CONNECTICUT
PETE V. DOMENICI, NEW MEXICO
MALCOLM WALLOP, WYOMING
JOHN W. WARNER, VIRGINIA
FRANK H. MURKOWSKI, ALASKA
DON NICKLES, OKLAHOMA
CHIC HECHT, NEVADA
DANIEL J. EVANS, WASHINGTON

J. BENNETT JOHNSTON, LOUISIANA
DALE BUMPERS, ARKANSAS
WENDELL H. FORD, KENTUCKY
HOWARD M. METZENBAUM, OHIO
JOHN MELCHER, MONTANA
BILL BRADLEY, NEW JERSEY
JEFF BINGAMAN, NEW MEXICO
JOHN D. ROCKEFELLER IV, WEST VIRGINIA

FRANK M. CUSHING, STAFF DIRECTOR
GARY G. ELLSWORTH, CHIEF COUNSEL
D. MICHAEL HARVEY, CHIEF COUNSEL FOR THE MINORITY

United States Senate
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510

May 7, 1986

The Honorable John S. Herrington
Secretary
U. S. Department of Energy
Washington, D.C. 20585

Dear Mr. Secretary:

On April 22, 1986, you appeared before the Senate Committee on Energy and Natural Resources to present testimony on Senate bill S.2073, the "Nuclear Facility Standardization Act of 1986." As a follow-up to this hearing, I would like to request that you provide written responses to the attached questions. If you have any questions on this matter, please call Marilyn Meigs of my staff at 202-224-4431.

In order that this information can be made part of the record, I must receive your written responses by no later than May 21, 1986.

Your participation in this hearing is greatly appreciated.

Sincerely,

Jim McClure

James A. McClure
Chairman

Attachment

QUESTION SUBMITTED BY SENATOR BUMPERS FOR SECRETARY HERRINGTON

Unresolved Safety Issues and Generic Safety Issues

In 1983, the NRC issued a report that listed 482 generic issues or "possible deficiencies in the design, construction or operation of several or a class of nuclear power plants such that the protection of the public from radiation may be inadequate." In 1984, the NRC reported that it had 12 more serious "unresolved safety issues", defined as issues that "pose important questions concerning the adequacy of existing safety requirements... and that involve conditions not likely to be acceptable over the lifetime of the plants affected." The GAO has estimated that it will take the NRC about 10 years to eliminate the backlog of unresolved issues.

QUESTION: Does the DOE bill require the resolution of these generic safety issues prior to the approval of a standardized plant design? If not, how does the standardized plant design concept advance the protection of the public health and safety beyond the present system?

Question from Senator Wendell H. Ford
for Secretary John S. Herrington

Hearing before the Senate Committee on Energy and Natural Resources
on Senate Bill S. 2073
"Nuclear Facility Standardization Act of 1986"
April 22, 1986

Can you cite two or three specific examples of nuclear powerplants that have completed construction on time and on budget within the last few years? For each example, please provide your opinion of what the main reasons for success were.

Questions from Senator J. Bennett Johnston
for Secretary John S. Herrington
and NRC Commissioners

Hearing before the Senate Committee on Energy and Natural Resources
on Senate Bill S. 2073
"Nuclear Facility Standardization Act of 1986"
April 22, 1986

1) Would this bill require that plants that receive a combined construction-operating permit meet the same standards as plants that receive a construction and operating permit under the present scheme?

If not, why not?

2) Would this bill guarantee persons living near a plant a hearing on adequacy of construction, readiness for operation and appropriateness of emergency planning before the plant operates?

If not, why not?

3) What does this bill do to hasten resolution of the numerous outstanding specific and generic safety issues that are now unresolved and routinely deferred in the present licensing process?

4) What would this bill do to shift the focus of licensing from a contest between lawyers to an engineering determination of safety?

5) Can the nuclear licensing process be reformed in an effective way without reforming the structure of the Commission?

For example, shouldn't the agency have an administrator who is responsible to Congress and the President and who can manage the very large NRC staff?

6) What place does the collegial structure of the Commission have in determining matters of safety?

7) What is your opinion of Senator Biden's suggestion, contained in the bill, S. 2291, he recently introduced, that an independent Nuclear Safety Board be established, which would review nuclear incidents and make determinations about scientific and engineering aspects of those incidents?

8) Please provide the Committee with specific examples of backfitting at nuclear plants that you consider unnecessary or overly costly.

9) The March, 1985, report of the NRC Regulatory Reform Task Force found that

> "There is a substantial amount of evidence that the (NRC) Staff's backfitting practices which have cost consumers billions of dollars, have made nuclear plants more difficult to operate and maintain, have injected uncertainty and paralyzing delay into the administrative process, and in some

instances may have reduced rather than enhanced public safety".

Would you please comment on this report?

10) Please provide specific examples of the kind of unneeded backfitting that would not occur if this bill were enacted.

FOLLOW-UP QUESTIONS FOR DOE
FROM SENATOR JAMES A. McCLURE
CHAIRMAN, COMMITTEE ON ENERGY AND NATURAL RESOURCES

(LICENSING REFORM HEARING, 4/22)

1. How do domestic nuclear plant costs and construction times compare with the French experience? The Japanese experience?

2. What is the status of progress in this country with respect to standardization of nuclear plant designs, pre-approval of sites, and controlled backfitting? How does this compare with similar progress in other countries?

3. Please respond to the comments made by Commissioner Asselstine in his letter that is attached to the NRC testimony provided for our 4/22 hearing.

Questions to John S. Herrington
From Senator James A. McClure

1. Since standard designs are already available, at least of nuclear steam supply systems, why do we need legislation?

2. How would you define a "standardized design"? How much of a nuclear plant can be standardized?

3. Is it true that the legislation would stifle, rather than enhance public participation in the licensing process?

Questions for Secretary Herrington

From Senator Evans

1. Have you made any projections on the effect this legislation could have on the interval between initial construction and the commencement of plant operations? What might be the impact would have on the cost to utilities of building a nuclear plant? Would this dramatically increase the attractiveness of nuclear as a generating option?

2. You argue in your testimony that both pre-approved designs and sites should remain valid for ten years. Would you preclude the NRC from reviewing and perhaps modifying their approvals before this time?

3. With nuclear plants it would seem to be essential to fully coordinate and integrate the site and the generating facility. In the NRC hearings on a pre-approval of a site, would there be limits placed so that sites would be approved only for specific designs? What kind of adjustments would have to be made in the pre-approved design prior to the granting of the proposed Construction Permit and Operating License.

4. Do the conditions placed upon re-opening the Combined Construction and Operating License prior to actual operation of a facility establish a "bar" to reviewing the license?

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 0 3 1986

The Honorable James A. McClure, Chairman
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

Enclosed for the record are Commission responses to the questions in your letter of May 7, 1985 with regard to the April 22 hearing on the "Nuclear Facility Standardization Act of 1986."

Sincerely,

Carlton Kammerer, Director
Office of Congressional Affairs

Enclosure:
As stated

cc: Rep. J. Bennett Johnston

U.S. NUCLEAR REGULATORY COMMISSION

RESPONSES TO QUESTIONS

ON

S. 2073, "NUCLEAR FACILITY STANDARDIZATION ACT OF 1986"

HEARING OF APRIL 22, 1986

SUBMITTED TO THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

JULY 3, 1986

QUESTION 1. WHAT WILL LEGISLATION ACCOMPLISH THAT NRC RULEMAKING CANNOT ACCOMPLISH IN TERMS OF EARLY SITE APPROVAL, STANDARDIZED PLANT DESIGNS, AND BACKFITTING?

ANSWER.

THE LEGISLATION WILL PERMIT THE NRC TO ISSUE COMBINED CONSTRUCTION PERMITS AND OPERATING LICENSES FOR APPLICATIONS THAT REFERENCE STANDARD DESIGN APPROVALS OR WHICH ARE BASED ON FINAL DESIGN INFORMATION. THE NRC COULD NOT ADOPT THE ONE-STEP LICENSING PROCESS, AS DESCRIBED IN THE BILL, WITHOUT SUCH LEGISLATION.

COMMISSIONER ASSELSTINE ADDS: ESSENTIALLY ALL OF THE ELEMENTS OF THE PROPOSED LEGISLATION CAN BE ACHIEVED BY COMMISSION REGULATION WITH THE EXCEPTION OF THE ISSUANCE OF A COMBINED CP/OL.

QUESTION 2. PLEASE PROVIDE FOR THE COMMITTEE THE FOLLOWING INFORMATION WITH RESPECT TO THE NRC'S EXPERIENCE WITH LICENSING THE MOST RECENT SIX NUCLEAR PLANTS:

A) DATE OF SUBMITTAL OF CONSTRUCTION PERMIT APPLICATION

B) DATE OF NRC APPROVAL OF CONSTRUCTION PERMIT APPLICATION

C) DATE OF SUBMITTAL OF OPERATING LICENSE APPLICATION

D) DATE OF NRC APPROVAL OF OPERATING LICENSE

E) DATE OF PLANT ASCENT TO FULL POWER

ANSWER.

THE FOLLOWING TABLE IS PROVIDED IN RESPONSE TO SUBPARTS A) THROUGH E).

ATTACHMENT TO QUESTION 2

MILESTONE DATA FOR LAST 6 PLANTS
DECLARED COMMERCIALLY OPERABLE

Plant	NSSS	A/E	Applied for CP	CP Issued	Applied for OL	5% Power Lic. Issued	Full Power Lic. Issued	Exceed 5% Power	Commercial Operations
Diablo Canyon 2	West	PG&E	07/01/68	12/09/70	07/10/73	04/26/85	08/26/85	11/03/85	03/13/86
Limerick 1	GE	Bechtel	02/27/70	06/19/74	03/17/81	10/26/84	08/08/85	08/10/85	02/01/86
Palo Verde 1	CE	Bechtel	07/11/74	05/25/76	10/05/79	12/31/84	06/01/85	06/06/85	01/27/86
Waterford 3	CE	EBASCO	12/31/70	11/14/74	09/28/78	12/18/84	03/16/85	03/18/85	09/24/85
Byron 1	West	Sargent & Lundy	02/23/73	12/31/75	06/26/78	10/31/84	02/14/85	02/24/85	09/10/85
Wolf Creek	West	Bechtel	04/01/74	05/17/77	02/21/80	03/11/85	06/04/85	06/06/85	09/03/85

QUESTION 3. WOULD THE PROPOSED LEGISLATION AFFECT IN ANY WAY WHATEVER INVOLVEMENT OR AUTHORITY THAT A STATE HAS WITH RESPECT TO THE LICENSING OF A COMMERCIAL NUCLEAR POWER PLANT?

ANSWER.

THE PROPOSED LEGISLATION WOULD NOT AFFECT EXISTING PROVISIONS GOVERNING A STATE'S AUTHORITY OR INVOLVEMENT WITH RESPECT TO THE LICENSING OF A COMMERCIAL NUCLEAR POWER PLANT. UNDER THE ATOMIC ENERGY ACT, THE FEDERAL GOVERNMENT RETAINS EXCLUSIVE AUTHORITY TO REGULATE THE NUCLEAR SAFETY ASPECTS OF REACTOR CONSTRUCTION AND OPERATION. THE STATES EXERCISE THEIR TRADITIONAL AUTHORITY OVER ECONOMIC QUESTIONS, SUCH AS THE NEED FOR POWER, TYPE OF FACILITIES TO BE LICENSED, LAND USE, AND RATEMAKING. THE STATES ARE ALSO AUTHORIZED TO REGULATE RADIOACTIVE AIR POLLUTANTS PURSUANT TO THE CLEAN AIR ACT, AND TO ISSUE DISCHARGE PERMITS PURSUANT TO THE CLEAN WATER ACT. IN ADDITION, COMMISSION REGULATIONS PERMIT A STATE TO PARTICIPATE IN REACTOR LICENSING PROCEEDINGS, EITHER AS A FULL PARTY OR AS AN "INTERESTED STATE." THE PROPOSED LEGISLATION WOULD NOT ALTER THESE PROVISIONS.

COMMISSIONER ASSELSTINE ADDS: I WOULD NOTE, HOWEVER, THAT A STATE'S RIGHT TO PARTICIPATE AS AN INTERESTED STATE IN LICENSING PROCEEDINGS WOULD BE AFFECTED BY THE PROPOSED LEGISLATION. THERE

IS NO RIGHT TO A HEARING AT THE PRE-OPERATIONAL STAGE AS THERE IS NOW UNDER SECTION 189 OF THE ATOMIC ENERGY ACT. UNDER THE PROPOSED LEGISLATION, THE DECISION TO BEGIN OR NOT TO BEGIN A HEARING IS LEFT TOTALLY WITHIN THE DISCRETION OF THE COMMISSION. IF THE COMMISSION DECIDES NOT TO HOLD A HEARING, THEN A STATE WILL HAVE NO OPPORTUNITY TO RAISE ISSUES AND HAVE THEM ADJUDICATED.

QUESTION 4. PLEASE LIST THOSE AREAS OF NUCLEAR REGULATION THAT THE STATES MAY ASSUME RESPONSIBILITY FOR UNDER THE AGREEMENT STATE PROVISION. PLEASE CONTRAST THOSE AREAS WITH OTHER AREAS WHERE THE STATES CANNOT ASSUME RESPONSIBILITY: I.E., AREAS OF REGULATION WHERE SOLE AUTHORITY RESTS WITH THE FEDERAL GOVERNMENT VIA NRC.

ANSWER.

SUBJECT TO A FINDING BY THE COMMISSION THAT THE REGULATORY PROGRAM OF THE STATE IS COMPATIBLE WITH THAT OF THE COMMISSION AND IS ADEQUATE TO PROTECT THE PUBLIC HEALTH AND SAFETY, THE STATES MAY ASSUME REGULATORY RESPONSIBILITY FOR ONE OR MORE OF THE FOLLOWING AREAS:

(1) BYPRODUCT MATERIALS AS DEFINED IN SECTION 11E.(1) OF THE ATOMIC ENERGY ACT, AS AMENDED;

(2) BYPRODUCT MATERIALS AS DEFINED IN SECTION 11E.(2) OF THE ATOMIC ENERGY ACT, AS AMENDED (MILL TAILINGS);

(3) SOURCE MATERIALS;

(4) SPECIAL NUCLEAR MATERIALS IN QUANTITIES NOT SUFFICIENT TO FORM A CRITICAL MASS;

(5) PERMANENT DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTE CONTAINING ONE OR MORE OF THE MATERIALS STATED ABOVE BUT NOT INCLUDING MILL TAILINGS.

IN CONTRAST, SECTION 274C. OF THE ACT PROHIBITS ANY AGREEMENT WITH A STATE FROM PROVIDING FOR DISCONTINUANCE OF ANY AUTHORITY AND RESPONSIBILITY OF THE NRC WITH RESPECT TO REGULATION OF:

"(1) THE CONSTRUCTION AND OPERATION OF ANY PRODUCTION OR UTILIZATION FACILITY;

"(2) THE EXPORT FROM OR IMPORT INTO THE UNITED STATES OF BYPRODUCT, SOURCE, OR SPECIAL NUCLEAR MATERIAL, OR OF ANY PRODUCTION OR UTILIZATION FACILITY;

"(3) THE DISPOSAL INTO THE OCEAN OR SEA OF BYPRODUCT, SOURCE OR SPECIAL NUCLEAR WASTE MATERIALS AS DEFINED IN REGULATIONS OR ORDERS OF THE COMMISSION;

"(4) THE DISPOSAL OF SUCH OTHER BYPRODUCT, SOURCE, OR SPECIAL NUCLEAR MATERIAL AS THE COMMISSION DETERMINES BY REGULATION OR ORDER SHOULD, BECAUSE OF THE HAZARDS OR POTENTIAL HAZARDS THEREOF, NOT BE SO DISPOSED OF WITHOUT A LICENSE FROM THE COMMISSION.

THE COMMISSION SHALL ALSO RETAIN AUTHORITY UNDER ANY SUCH AGREEMENT TO MAKE A DETERMINATION THAT ALL APPLICABLE STANDARDS AND REQUIREMENTS HAVE BEEN MET PRIOR TO TERMINATION OF A LICENSE FOR BYPRODUCT MATERIAL, AS DEFINED IN SECTION 11E.(2)."

SECTION 274C OF THE ACT ALSO PROVIDES THAT NOTWITHSTANDING ANY AGREEMENT BETWEEN THE COMMISSION AND ANY STATE PURSUANT TO SUBSECTION B., THE COMMISSION IS AUTHORIZED BY RULE, REGULATION, OR ORDER TO REQUIRE THAT THE MANUFACTURER, PROCESSOR, OR PRODUCER OF ANY EQUIPMENT, DEVICE, COMMODITY, OR OTHER PRODUCT CONTAINING SOURCE, BYPRODUCT, OR SPECIAL NUCLEAR MATERIAL SHALL NOT TRANSFER POSSESSION OR CONTROL OF SUCH PRODUCT EXCEPT PURSUANT TO A LICENSE ISSUED BY THE COMMISSION. PURSUANT TO THIS PROVISION THE NRC RETAINS AUTHORITY OVER THE DISTRIBUTION OF CONSUMER PRODUCTS CONTAINING BYPRODUCT, SOURCE OR SPECIAL NUCLEAR MATERIALS (E.G., SMOKE DETECTORS).

UNDER SECTIONS 83, 84 AND 161 OF THE ACT, CERTAIN AUTHORITIES OVER MILL TAILINGS ARE RETAINED BY THE NRC IN THOSE STATES REGULATING BYPRODUCT MATERIAL AS DEFINED IN SECTION 11E.(2) OF THE ACT.

QUESTION 5. SINCE STANDARD DESIGNS ARE ALREADY AVAILABLE, AT LEAST OF NUCLEAR STEAM SUPPLY SYSTEMS, WHY DO WE NEED LEGISLATION?

ANSWER.

LEGISLATION IS NOT REQUIRED IN ORDER TO APPROVE STANDARDIZED DESIGNS. HOWEVER, AS NOTED IN RESPONSE TO QUESTION 1, IF STANDARDIZED DESIGNS ARE TO BE APPROVED UNDER THE PROPOSED ONE-STEP LICENSING PROCESS, THIS COULD NOT BE ACCOMPLISHED WITHOUT LEGISLATION.

QUESTION 6. HOW WOULD YOU DEFINE A "STANDARDIZED DESIGN"? HOW MUCH OF A NUCLEAR PLANT CAN BE STANDARDIZED?

ANSWER.

THE TERM "STANDARDIZED DESIGN" MEANS A DESIGN WHICH THE COMMISSION DETERMINES IS SUFFICIENTLY DETAILED AND COMPLETE TO SUPPORT LICENSING OF A COMMERCIAL PRODUCTION OR UTILIZATION FACILITY OR APPROVAL OF A MAJOR PORTION OF SUCH A FACILITY WHEN REFERENCED IN AN APPLICATION FOR A CONSTRUCTION PERMIT OR AN OPERATING LICENSE OR A COMBINED CONSTRUCTION PERMIT AND OPERATING LICENSE OR A DESIGN APPROVAL AND WHICH IS USABLE FOR A MULTIPLE NUMBER OF UNITS AND/OR AT A MULTIPLE NUMBER OF SITES WITHOUT REOPENING OR REPEATING THE REVIEW.

ESSENTIALLY ALL OF A NUCLEAR POWER PLANT DESIGN COULD BE STANDARDIZED WITH THE EXCEPTION OF THOSE PORTIONS OF THE DESIGN WHICH ARE SITE-SPECIFIC.

COMMISSIONER ASSELSTINE ADDS: I WOULD INCLUDE IN THE DEFINITIONS OF A STANDARDIZED DESIGN THE REQUIREMENT THAT THE DESIGN CONTAIN SUFFICIENTLY COMPLETE INFORMATION TO RESOLVE ALL DESIGN ISSUES AFFECTING SAFETY PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. THE PROPOSED LEGISLATION DOES NOT CONTAIN SUCH A REQUIREMENT.

QUESTION 7. IS IT TRUE THAT THE LEGISLATION WOULD STIFLE, RATHER THAN ENHANCE PUBLIC PARTICIPATION IN THE LICENSING PROCESS?

ANSWER.

S.2073 DOES NOT "STIFLE" PUBLIC PARTICIPATION IN THE LICENSING PROCESS. RATHER S.2073 WOULD ENHANCE MEANINGFUL PUBLIC PARTICIPATION EARLY-ON IN THE LICENSING PROCESS BY REQUIRING THE APPLICANT FOR A COMBINED CONSTRUCTION PERMIT/OPERATING LICENSE TO SUBMIT AN ESSENTIALLY COMPLETE DESIGN FOR THE NUCLEAR POWER FACILITY, AS WELL AS TO SPECIFY THE REQUIRED INSPECTIONS, TESTS, ANALYSES AND ACCEPTANCE CRITERIA WHICH WILL PROVIDE REASONABLE ASSURANCE THAT THE FACILITY HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH THE LICENSE. THIS WILL FACILITATE AND MAKE MORE EFFECTIVE THE PUBLIC'S PARTICIPATION IN THE LICENSING PROCESS, SINCE S.2073 REQUIRES AN APPLICANT TO SUBMIT MUCH MORE INFORMATION PRIOR TO AUTHORIZATION OF FACILITY CONSTRUCTION THAN IS CURRENTLY REQUIRED UNDER THE ATOMIC ENERGY ACT REGARDING THE DESIGN OF THE FACILITY AND HOW THE APPLICANT INTENDS TO DEMONSTRATE COMPLIANCE WITH SPECIFIED CONSTRUCTION AND OPERATION REQUIREMENTS FOLLOWING ISSUANCE OF THE COMBINED CONSTRUCTION PERMIT/OPERATING LICENSE.

QUESTION 7. (CONTINUED) - 2 -

IN SUMMARY, SPECIFICATION OF THE FACILITY DESIGN, AND THE PRESCRIBED INSPECTIONS, TESTS, ANALYSES AND ACCEPTANCE CRITERIA AS PART OF THE COMBINED CP/OL BEFORE CONSTRUCTION COMMENCES SHOULD ENHANCE THE QUALITY OF CONSTRUCTION OF NUCLEAR POWER PLANTS, ADD STABILITY TO THE REGULATORY PROCESS, AND FACILITATE PUBLIC PARTICIPATION IN NUCLEAR POWER PLANT LICENSING DECISIONS. IT SHOULD BE NOTED THAT WHILE PROVIDING FOR WHAT SHOULD BE A MORE FOCUSED AND EFFECTIVE PUBLIC PARTICIPATION IN THE EARLY STAGES OF THE LICENSING PROCESS, THE LEGISLATION DOES MAKE IT MORE DIFFICULT FOR POTENTIAL INTERVENORS TO RAISE LITIGABLE ISSUES AT THE TAIL END OF THE PROCESS. THAT IS THE TRADE-OFF, AND AN APPROPRIATE ONE.

COMMISSIONER ASSELSTINE ADDS: UNFORTUNATELY, THE COMMISSION'S RESPONSE DOES NOT TELL THE WHOLE STORY. THE PROPOSED LEGISLATION CONTAINS NO RIGHT TO A HEARING AT THE PRE-OPERATION STAGE AS DOES SECTION 189 OF THE ATOMIC ENERGY ACT. THE DECISION TO BEGIN OR NOT TO BEGIN A HEARING IS LEFT TOTALLY WITHIN THE DISCRETION OF THE COMMISSION. THERE ARE THREE TYPES OF ISSUES WHICH CAN ONLY BE ADEQUATELY LITIGATED AT THE PRE-OPERATION STAGE -- WHETHER THE PLANT WAS BUILT IN COMPLIANCE WITH THE LICENSE AND THE COMMISSION'S REGULATIONS, WHETHER THE PLANT'S MANAGEMENT AND OPERATIONS WILL BE ADEQUATE, AND WHETHER EMERGENCY PLANNING WILL BE ADEQUATE. BY TAKING AWAY THE RIGHT TO A HEARING NOW PROVIDED BY §189 AND SUBSTITUTING A DISCRETIONARY HEARING, THE PROPOSED LEGISLATION SUBSTANTIALLY RESTRICTS THE PUBLIC'S ABILITY TO PARTICIPATE ON THESE THREE IMPORTANT ISSUES.

QUESTION 8. ARE THERE ANY ISSUES THAT CANNOT BE ADEQUATELY DEALT WITH DURING THE COMBINED CONSTRUCTION PERMIT AND OPERATING LICENSE STAGE - ISSUES LIKE EMERGENCY PLANNING, READINESS FOR OPERATION, ETC? IF YOUR ANSWER IS YES, HOW WOULD S.2073 ASSURE THAT THESE ISSUES ARE PROPERLY ADDRESSED AT SOME LATER POINT BUT PRIOR TO COMMENCEMENT OF OPERATION OF THE PLANT.

ANSWER.

IT IS THE COMMISSION'S POSITION THAT ISSUES INVOLVING THE ADEQUACY OF THE SITE, THE DESIGN OF THE FACILITY, THE METHOD OF CONSTRUCTION, THE PROPOSED MEASURES (SUCH AS TESTING, INSPECTION AND ANALYSES) TO ENSURE THE QUALITY OF CONSTRUCTION AND OPERATION, AND THE MEASURES FOR EMERGENCY RESPONSE CAN ALL BE RESOLVED DURING THE COMBINED CONSTRUCTION PERMIT/OPERATING LICENSE STAGE. UNDER S.2073, OPPORTUNITIES FOR PUBLIC PARTICIPATION WILL BE FOCUSED ON APPROVALS AT THE BEGINNING OF THE PROCESS, AFTER THE DESIGN IS ESSENTIALLY COMPLETE BUT BEFORE CONSTRUCTION IS COMMENCED AND LONG BEFORE ANY SUBSTANTIAL CONSTRUCTION HAS OCCURRED. THE PROPOSALS ALSO PROVIDE THAT CONSTRUCTION QUALITY WILL BE ASSURED THROUGH A PROGRAM OF INSPECTIONS, TESTS AND ANALYSES WHICH ARE SPECIFIED IN THE COMBINED CONSTRUCTION PERMIT AND OPERATING LICENSE.

S.2073 PROVIDES THAT ISSUES INVOLVING THE ADEQUACY OF IMPLEMENTATION OF CONSTRUCTION, THE QA PROGRAM, OR THE INSPECTION AND TESTING

PROGRAM WHICH MAY ARISE AFTER THE COMBINED CONSTRUCTION PERMIT AND OPERATING LICENSE HEARING STAGE MAY BE RAISED BY THE PUBLIC PRIOR TO THE COMMENCEMENT OF OPERATION OF THE PLANT, AS WELL AS PROVIDING THE PUBLIC WITH THE OPPORTUNITY TO REQUEST A HEARING UPON A SHOWING OF GOOD CAUSE. AN OPPORTUNITY FOR A SECOND PUBLIC HEARING WOULD BE PROVIDED PRIOR TO COMMENCEMENT OF OPERATION OF THE FACILITY IF GOOD CAUSE EXISTS. GOOD CAUSE FOR HEARING WOULD BE DEFINED TO EXIST ONLY WHERE AN ISSUE CONSISTS OF A SUBSTANTIAL DISPUTE OF FACT NECESSARY FOR THE COMMISSION'S DECISION THAT CANNOT BE RESOLVED WITH SUFFICIENT ACCURACY EXCEPT AT A HEARING AND EITHER (1) THE ISSUE WAS NOT AND COULD NOT HAVE BEEN RAISED AND RESOLVED IN ANY PROCEEDING FOR THE ISSUANCE, MODIFICATION OR AMENDMENT OF A LICENSE, PERMIT OR APPROVAL OF THAT FACILITY, ITS SITE OR DESIGN; OR (2) A SHOWING HAS BEEN MADE THAT (I) THERE HAS BEEN NONCONFORMANCE WITH THE LICENSE; (II) SUCH NONCONFORMANCE HAS NOT BEEN CORRECTED; AND (III) SUCH NONCONFORMANCE COULD MATERIALLY AND ADVERSELY AFFECT THE SAFE OPERATION OF THE FACILITY. THE COMMISSION POINTS OUT THAT UNDER THE PROPOSED SECTION 189(b)(2) IN S.2073, WHILE THE PUBLIC WILL HAVE THE OPPORTUNITY TO REQUEST A HEARING PRIOR TO PLANT OPERATION THE COMMISSION NEED NOT COMPLETE THE HEARING PRIOR TO PLANT OPERATION IF THE COMMISSION FINDS THAT COMPLETION OF THE HEARING PRIOR TO OPERATION IS NOT NECESSARY "TO PROVIDE REASONABLE ASSURANCE OF THE PUBLIC HEALTH AND SAFETY AND COMMON DEFENSE AND SECURITY." IN ANY EVENT, PRIOR TO THE COMMENCEMENT OF OPERATION, THE COMMISSION WOULD DETERMINE, BASED UPON THE REQUISITE PROGRAM OF INSPECTIONS, TESTS, AND ANALYSES, WHETHER CONSTRUCTION HAS BEEN COMPLETED IN CONFORMANCE WITH THE COMBINED CONSTRUCTION PERMIT AND OPERATING LICENSE AND CONSISTENT WITH THE REGULATIONS OF THE COMMISSIONS.

COMMISSIONER ASSELSTINE ADDS: THE COMMISSION'S RESPONSE DOES NOT REALLY ANSWER THE QUESTION. AS A PRACTICAL MATTER, THE THREE ISSUES I IDENTIFIED IN MY RESPONSE TO QUESTION 7 CANNOT BE ADEQUATELY RESOLVED AT THE COMBINED CP/OL STAGE BECAUSE THE INFORMATION NECESSARY TO RESOLVE THEM WILL NOT BE AVAILABLE UNTIL THE PLANT IS SUBSTANTIALLY BUILT AND THE UTILITY HAS BEGUN TO MAKE PREPARATIONS FOR OPERATION. FOR EXAMPLE, IT IS UNLIKELY THAT INSPECTIONS AND TESTS CAN BE DEFINED IN ADVANCE TO PROVIDE IN ADVANCE FULL ASSURANCE THAT THE LICENSEE'S PERFORMANCE WILL SATISFY ALL APPLICABLE REQUIREMENTS. THE RECENT CONSTRUCTION QUALITY ASSURANCE PROBLEMS AT A NUMBER OF PLANTS IN SPITE OF OUR INSPECTION AND TESTING REQUIREMENTS ARE EVIDENCE OF THIS. THUS, THE RIGHT TO A HEARING ON THESE ISSUES PROVIDES AN IMPORTANT CHECK ON THE LICENSEE'S AND THE NRC STAFF'S PERFORMANCE.

THE COMMISSION ARGUES, HOWEVER, THAT THE PROPOSED LEGISLATION PROVIDES AN OPPORTUNITY FOR A HEARING ON THESE ISSUES AT THE PRE-OPERATION STAGE AND THAT IS SUFFICIENT. UNFORTUNATELY, THE STANDARD THE PUBLIC MUST MEET IN ORDER TO OBTAIN A HEARING IS

EXTREMELY HIGH AND WILL BE VERY DIFFICULT TO MEET. EVEN IF A PROSPECTIVE INTERVENOR CAN MEET THE "GOOD CAUSE" STANDARD, THE COMMISSION STILL HAS THE DISCRETION TO REFUSE TO GRANT A HEARING IF THE COMMISSION DECIDES THAT THE ISSUE DOES NOT CONSIST OF "A SUBSTANTIAL DISPUTE OF FACT, NECESSARY FOR THE COMMISSION'S DECISION, THAT CANNOT BE RESOLVED WITH SUFFICIENT ACCURACY EXCEPT AT A HEARING." GIVEN THE FACT THAT THE COMMISSION HAS RECENTLY BEEN ACTING TO LIMIT PUBLIC ACCESS TO THE HEARING PROCESS AND THAT THE COMMISSION HAS ONLY ON THE RAREST OF OCCASIONS GRANTED A DISCRETIONARY HEARING, THE COMMISSION IS NOT LIKELY TO MAKE SUCH A FINDING.

QUESTION 9. ARE THERE ANY NRC RULEMAKINGS OR REGULATIONS ON PRE-APPROVAL OF STANDARDIZED PLANT DESIGNS, ON PRE-APPROVAL OF SITES, OR ON BACKFITTING REFORMS? IF SO, WHAT DOES THE BILL DO FOR LICENSING REFORM THAT YOU CAN'T DO BY RULEMAKING? WHAT IS THE SIGNIFICANCE OF HAVING STATUTORY LANGUAGE?

ANSWER.

THERE ARE NO RULEMAKINGS UNDERWAY ON PRE-APPROVAL OF STANDARDIZED PLANT DESIGNS, PRE-APPROVAL OF SITES, OR BACKFITTING REFORMS.

THE NRC DOES HAVE EXISTING REGULATIONS RELATED TO STANDARDIZATION (10 CFR 50, APPENDICES N, M & O), BACKFITTING (10 CFR 50.109), AND PRE-APPLICATION EARLY REVIEW OF SITE SUITABILITY ISSUES (10 CFR PART 50, APPENDIX Q). THE NRC ALSO HAS A PROPOSED REGULATION RELATED TO SITING.

ENACTMENT OF THE LEGISLATION WOULD PROVIDE A ONE-STEP LICENSING OPTION. IT WOULD ALSO PROVIDE AN IMPORTANT NATIONAL POLICY OBJECTIVE OF STANDARDIZATION AND EARLY SITE APPROVALS AS A MEANS TO FACILITATE HIGH QUALITY CONSTRUCTION, SAFE OPERATION AND COST REDUCTIONS.

QUESTION 10. IS THE BILL LANGUAGE ON BACKFITTING SUFFICIENTLY FLEXIBLE TO ALLOW FOR CHANGES IN NRC BACKFITTING REGULATIONS IF IT DISCOVERS SOME UNFORESEEABLE PROBLEMS WITH ITS CURRENT STANDARDS?

ANSWER.

THE BILL S.2073 WOULD ESSENTIALLY CODIFY KEY PROVISIONS OF THE COMMISSION'S EXISTING BACKFITTING RULE, BUT IS MUCH BROADER IN SCOPE SINCE IT WOULD APPLY TO ALL REQULATORY DECISIONS ON ANY SUBJECT. IF ENACTED, THE STANDARD TO BE USED AND THE FACTORS TO BE CONSIDERED IN EVALUATING A PROPOSED BACKFIT WOULD BECOME STATUTORY REQUIREMENTS FOR A WIDE RANGE OF REGULATORY ACTIONS. IF THE COMMISSION ENCOUNTERED UNFORESEEN DIFFICULTIES WITH THAT STANDARD OR WITH ONE OR MORE OF THOSE FACTORS, LEGISLATION WOULD BE REQUIRED TO REMEDY THE PROBLEM. THUS, THE BILL LANGUAGE ON BACKFITTING IS MUCH TOO BROAD.

COMMISSIONER BERNTHAL ADDS: VARIOUS SECTIONS OF S.836 DEALING WITH BACKFITS DIRECT THAT, BEFORE A FACILITY MODIFICATION MAY BE REQUIRED, THE COMMISSION MUST DETERMINE, BASED UPON SIGNIFICANT NEW INFORMATION, THAT THE PROPOSED MODIFICATION "IS REQUIRED TO PROTECT THE PUBLIC HEALTH AND SAFETY...." AND THAT "THE MODIFICATION WILL SUBSTANTIALLY ENHANCE THE PUBLIC HEALTH AND SAFETY....".

QUESTION 10. (CONTINUED) - 2 -

AS I INDICATED IN MY TESTIMONY BEFORE THE COMMITTEE, I AM TROUBLED BY THE QUOTED LANGUAGE IN THE VARIOUS SECTIONS OF S.836. SUFFICE IT TO SAY THAT THIS LANGUAGE IS SUSCEPTIBLE TO SEVERAL READINGS -- NONE OF THEM SATISFACTORY, IN MY VIEW. MOREOVER, WHILE THE PROPOSED LEGISLATION WAS NOT, I BELIEVE, INTENDED TO BE INCONSISTENT WITH THE NRC BACKFIT RULE, THE FACT REMAINS THAT NO READING OF THE "BACKFIT" LANGUAGE IN S.836 IS CONSISTENT WITH THE NRC'S RECENTLY PROMULGATED RULE.

UNDER THE NRC BACKFIT RULE, IF A MODIFICATION IS REQUIRED TO PROTECT PUBLIC HEALTH AND SAFETY, IT IS BY DEFINITION NOT A BACKFIT. BACKFITS ARE THOSE MODIFICATIONS WHICH GO BEYOND MEASURES REQUIRED FOR MINIMUM ACCEPTABLE PROTECTION OF PUBLIC HEALTH AND SAFETY. THUS, ONE COULD READ THE ABOVE LANGUAGE AS MANDATING THAT NO BACKFITS, AS DEFINED IN THE NRC'S OWN RULE, WOULD EVER BE PERMITTED.

SUCH A READING IS CLEARLY CONTRARY TO THE PHILOSOPHY OF THE COMMISSION'S BACKFIT RULE, WHICH ADOPTS AS FUNDAMENTAL THE PREMISE THAT SUBSTANTIAL COST BENEFICIAL IMPROVEMENTS ARE POSSIBLE AND MAY BE DESIRABLE, NOTWITHSTANDING THE FACT THAT THERE MAY BE NO UNDUE RISK TO THE PUBLIC ABSENT THE PROPOSED MODIFICATION. (TO ILLUSTRATE, WHILE IT MAY BE COMMONLY AGREED THAT AIR TRAVEL POSES "NO UNDUE RISK," AN INEXPENSIVE MODIFICATION THAT PROMISED TO REDUCE THE NUMBER OF COMMERCIAL AVIATION ACCIDENTS BY TEN TIMES WOULD SURELY BE QUICKLY ADOPTED AND ROUNDLY APPLAUDED.)

A SECOND (IF LESS LIKELY) READING OF THE PROPOSED LEGISLATION WOULD ALSO BE TROUBLING. SINCE THE LEGISLATION MANDATES THAT ANY PROPOSED BACKFIT BE REQUIRED BOTH TO PROTECT PUBLIC HEALTH AND SAFETY AND SUBSTANTIALLY ENHANCE THE SAME (EMPHASIS ADDED), IT WOULD APPEAR THAT SMALL DEVIATIONS FROM THE "NO UNDUE RISK" STANDARD ARE TO BE TOLERATED BY THE COMMISSION.

IF A BACKFIT IS NEEDED TO ASSURE MINIMUM ACCEPTABLE RISK, BUT THE MODIFICATION CONSTITUTES A RELATIVELY SMALL (AS OPPOSED TO SUBSTANTIAL) INCREMENT IN SAFETY, THE LANGUAGE COULD IN PRINCIPLE BE READ AS PROHIBITING THE COMMISSION FROM IMPLEMENTING THAT MODIFICATION. THIS ALTERNATIVE READING IS ARGUABLY CONTRARY TO THE ATOMIC ENERGY ACT'S "REASONABLE ASSURANCE" AND "NO UNDUE RISK" STANDARDS.

NOTEWORTHY IN ITS ABSENCE FROM S.836 IS ANY REQUIREMENT, PRIOR TO APPROVING MODIFICATIONS TO FACILITIES, THAT THE COMMISSION CONSIDER THE CENTRAL AND DISPOSITIVE CRITERION OF ITS NEW BACKFIT RULE: THE RELATIVE COSTS AND BENEFITS OF IMPOSING SUCH MODIFICATIONS.

CONGRESS SHOULD BE MINDFUL OF THESE PROBLEMS IN LANGUAGE AND DEFINITION.

QUESTION 11. THE NRC CURRENTLY HAS SOME FORTY-ODD "UNRESOLVED SAFETY ISSUES" THAT NEED TO BE ADDRESSED WITH RESPECT TO CURRENTLY LICENSED PLANTS. WHAT ARE THE PROSPECTS THAT FUTURE "STANDARDIZED" PLANT DESIGNS WILL NOT BE PLAGUED WITH THE SAME UNRESOLVED SAFETY ISSUES?

ANSWER.

WHILE THERE ARE GENERIC SAFETY ISSUES (GSIS) IN VARIOUS STAGES OF DEVELOPMENT AND RESOLUTION, ONLY A SMALL PERCENTAGE OF THESE ARE CONSIDERED SIGNIFICANT ENOUGH TO BE DESIGNATED BY THE COMMISSION AS "UNRESOLVED SAFETY ISSUES" (USIS). THE REMAINING GSIS ARE CLASSIFIED AS HIGH PRIORITY OR MEDIUM PRIORITY GSIS. THERE ARE CURRENTLY 11 UNRESOLVED SAFETY ISSUES (USIS) WHICH HAVE NOT BEEN TECHNICALLY RESOLVED. ALL OF THE REMAINING USIS HAVE A PUBLISHED RESOLUTION WHICH HAS BEEN OR IS BEING IMPLEMENTED AT OPERATING PLANTS AND/OR IN NEW DESIGNS AS DETERMINED BY THE RESOLUTION. FOR THE 11 OUTSTANDING USIS, EXTENSIVE TECHNICAL INFORMATION HAS BEEN DEVELOPED, INCLUDING ALTERNATIVE APPROACHES TO RESOLUTION OF THE ISSUE WHICH WOULD BE OF DIRECT APPLICATION IN THE DESIGN OF A NEW PLANT. WE BELIEVE THAT THIS INFORMATION PROVIDES SUFFICIENT GUIDANCE TO PERMIT AN APPLICANT TO RESOLVE EACH OF THE REMAINING USIS ON A NEW PLANT DESIGN TO THE SATISFACTION OF THE NRC. IT SHOULD BE NOTED THAT THE COMMISSION'S POLICY STATEMENT ON SEVERE

REACTOR ACCIDENTS REGARDING FUTURE DESIGNS AND EXISTING PLANTS (50 FR 32138) REQUIRES THAT FUTURE PLANTS DEMONSTRATE TECHNICAL RESOLUTION OF ALL APPLICABLE UNRESOLVED SAFETY ISSUES AND THE MEDIUM AND HIGH PRIORITY GENERIC SAFETY ISSUES (GSIs). THEREFORE, THE EXISTING USIs AND GSIs WILL BE RESOLVED FOR A STANDARDIZED DESIGN PRIOR TO THE ISSUANCE OF A DESIGN APPROVAL.

COMMISSIONER ASSELSTINE ADDS: THE COMMISSION'S VARIOUS POLICY STATEMENTS MAY ENCOURAGE THE INDUSTRY TO ENSURE THE STANDARDIZED DESIGNS ADEQUATELY RESOLVE ALL UNRESOLVED AND GENERIC SAFETY ISSUES. HOWEVER, THERE IS NO LEGAL REQUIREMENT THAT THEY DO SO. THE LEGISLATION SHOULD INCLUDE SUCH A REQUIREMENT.

QUESTION 12. ARE THE PROVISIONS IN S. 2073 THAT RELATE TO STANDARDIZED DESIGNS SUITABLE FOR APPROVAL OF DESIGNS FOR BREEDER REACTORS, GAS-COOLED REACTORS, AND OTHER ADVANCED REACTOR DESIGNS? IF NOT, WHAT COULD BE DONE TO FIX THE LANGUAGE IN THIS SECTION SO THAT FUTURE REACTOR DESIGNS COULD BE ELIGIBLE FOR STANDARDIZATION APPROVAL?

ANSWER.

S. 2073 IS THE DOE LEGISLATIVE PROPOSAL. THE PROVISIONS OF S. 836, WHICH IS THE NRC PROPOSAL, APPLY TO ANY THERMAL NEUTRON POWER GENERATING FACILITY. AS NOTED IN THE RESPONSE TO QUESTION 19, THE COMMISSION DOES NOT BELIEVE THERE IS AN ADEQUATE EXPERIENCE BASE FOR THE LICENSING OF BREEDER REACTORS TO RECOMMEND THEIR INCLUSION IN THE PROVISIONS OF THE PROPOSED BILL.

QUESTION 13. UNDER TODAY'S LICENSING REGULATIONS, HOW MANY OPPORTUNITIES ARE THERE FOR PUBLIC HEARINGS FROM DESIGN STAGE TO FULL POWER OPERATION OF A PLANT? ARE THESE MANDATORY OR OPTIONAL HEARINGS? HOW MANY OPPORTUNITIES FOR PUBLIC HEARINGS WOULD BE AVAILABLE UNDER S.2073? ARE THESE MANDATORY OR OPTIONAL? DOES THE TIMING OF THESE HEARINGS ENHANCE THE VALUE AND PRODUCTIVITY OF THESE HEARINGS AS COMPARED TO TODAY'S PROCESS?

ANSWER.

SECTION 189 OF THE ATOMIC ENERGY ACT CURRENTLY REQUIRES THAT MANDATORY HEARINGS BE HELD IN CONNECTION WITH A CONSTRUCTION PERMIT REQUEST. SECTION 189 ALSO PROVIDES FOR OPPORTUNITIES FOR HEARINGS IN CONNECTION WITH THE "GRANTING, SUSPENDING, REVOKING OR AMENDING" OF CONSTRUCTION PERMITS, AS WELL AS THE GRANTING OF OPERATING LICENSES (UNDER SECTION 189, THE OPPORTUNITY FOR A HEARING IS NOT THE SAME AS A MANDATORY HEARING; A REQUEST FOR A HEARING WHERE AN OPPORTUNITY IS PROVIDED WILL BE GRANTED ONLY IF THE REQUEST MEETS THE REQUIREMENTS OF THE COMMISSION, AS SET FORTH IN ITS REGULATIONS AND IN APPLICABLE COMMISSION CASE LAW).

UNDER S.2073, A MANDATORY HEARING IS STILL REQUIRED PRIOR TO THE GRANTING OF A COMBINED CONSTRUCTION PERMIT/OPERATING LICENSE. WHERE S.2073 DIFFERS FROM THE CURRENT LAW IS THE TIMING FOR THE LITIGATION

OF ISSUES. THE PROPOSED BILL WOULD INTEGRATE AND CONSOLIDATE INTO A SINGLE HEARING ALL LITIGATION ON ISSUES REGARDING THE ADEQUACY OF THE FACILITY DESIGN, PROPOSED CONSTRUCTION METHODS, QA PROGRAM AND EMERGENCY PREPAREDNESS PLANNING FOR THE FACILITY. THIS HEARING WOULD BE COMPLETED PRIOR TO THE GRANTING OF A COMBINED CONSTRUCTION PERMIT/OPERATING LICENSE AND THE COMMENCEMENT OF CONSTRUCTION. S.2073 WOULD ELIMINATE THE PROBLEMS ASSOCIATED WITH THE CURRENT LICENSING PROCESS WHERE AN APPLICANT COMMENCES CONSTRUCTION PRIOR TO A FINAL AGENCY DETERMINATION ON THE ENGINEERING ADEQUACY OF THE FACILITY DESIGN.

COMMISSIONER ASSELSTINE ADDS: AS I HAVE ALREADY EXPLAINED IN PREVIOUS RESPONSES, THERE ARE CERTAIN ISSUES WHICH JUST CANNOT BE ADEQUATELY RESOLVED AT THE CP/OL STAGE. SO THERE IS A NEED FOR A RIGHT TO A HEARING AT THE PRE-OPERATION STAGE.

IN ADDITION, THE COMMISSION ASSERTS THAT S. 2073 WOULD ELIMINATE THE PROBLEMS ASSOCIATED WITH THE PRESENT LICENSING PROCESS WHERE AN APPLICANT COMMENCE CONSTRUCTION PRIOR TO A FINAL AGENCY DETERMINATION OF THE ENGINEERING ADEQUACY OF THE FACILITY DESIGN. UNFORTUNATELY, THAT IS NOT ACCURATE. THE PROPOSED LEGISLATION WOULD ALLOW A CP FOR LESS THAN A COMPLETE DESIGN. IN ORDER TO ELIMINATE THE PROBLEMS OF THE PRESENT SYSTEM THE LEGISLATION WOULD HAVE TO REQUIRE A COMPLETE DESIGN BEFORE A CP COULD BE ISSUED.

QUESTION 14. MR. CHAIRMAN, THE NRC AND ITS PREDECESSOR AGENCIES HAVE BEEN LICENSING NUCLEAR POWER PLANTS FOR MANY YEARS. THROUGH THE ATOMIC ENERGY ACT, YOUR AGENCY HAS A GREAT DEAL OF FLEXIBILITY IN SETTING REGULATIONS FOR LICENSING AND TO INSTITUTE CHANGES REQUIRED FOR PROMOTING STANDARDIZED DESIGNS FROM THE NUCLEAR UTILITIES AND VENDORS. WHY DOES THE NRC FEEL THAT LEGISLATION IS REQUIRED TO GO FORWARD WITH STANDARDIZATION?

ANSWER.

SEE RESPONSE TO QUESTIONS NUMBER 1 AND 9.

QUESTION 15: COMMISSIONER ZECH, YOU SEEM TO BE ONE COMMISSIONER AT THE NRC WHO HAS TAKEN A STRONG INTEREST IN NUCLEAR POWER PLANT STANDARDIZATION LEGISLATION. WOULD YOU PLEASE EXPLAIN FOR THE COMMITTEE YOUR IDEAS OF STANDARD NUCLEAR POWER PLANTS, THE STEPS REQUIRED IN THE DESIGN, LICENSING, CONSTRUCTING AND OPERATING PHASES, HOW THE NRC SHOULD PARTICIPATE IN THESE STEPS AND HOW CONGRESS CAN INSURE THE IMPLEMENTATION OF THE PROCESS?

ANSWER.

THE MOST IMPORTANT ISSUE UNDERLYING STANDARDIZATION IS ITS POTENTIAL CONTRIBUTION TO IMPROVING THE PROTECTION OF PUBLIC HEALTH AND SAFETY. I AM CONVINCED THROUGH MY EXPERIENCE WITH THE U.S. NAVY NUCLEAR PROGRAM THAT THERE ARE MANY SAFETY BENEFITS TO BE ACHIEVED FROM "STANDARDIZED" U.S. COMMERCIAL NUCLEAR POWER PLANTS. FOR EXAMPLE, IN ADDITION TO REACTOR DESIGN, TRAINING, MAINTENANCE, AND OPERATIONS CAN ALL BE STANDARDIZED. I BELIEVE THAT THE SAFETY RECORD OF THE NAVY PROGRAM SUPPORTS THIS VIEW. THE NAVY PROGRAM BEGAN WITH CONSIDERATION OF A NUMBER OF DIFFERENT DESIGN CONCEPTS. EARLY IN THE PROGRAM ONLY A FEW DESIGNS WERE SELECTED FOR USE IN THE PROPULSION PLANTS FOR THE FLEET. MANY NUCLEAR SUBMARINES HAD EXACTLY THE SAME TYPE NUCLEAR POWER PLANT. THIS RESULTED IN SOME IMPORTANT AND SIGNIFICANT SAFETY ADVANTAGES. THE NAVY'S BASIC NUCLEAR POWER TRAINING WAS TAUGHT FROM A STANDARD CURRICULUM. THE BASIC SYSTEMS CONCEPTS WERE APPLICABLE TO ALL

QUESTION 15. (CONTINUED) - 2 -

PLANTS AND THUS TRANSFERABLE. THE DESIGNS WERE COMPLETE, WELL UNDERSTOOD AND HAVE SINCE DEMONSTRATED RELIABILITY THAT COMES FROM HAVING MANY YEARS OF OPERATION WITH THE SAME DESIGN. I FEEL THAT THE U.S. NAVY EXPERIENCE IS A VALUABLE AND SIGNIFICANT EXAMPLE OF THE BENEFITS OF STANDARDIZATION.

WHEN I FIRST BECAME A COMMISSIONER I INFORMED THE PUBLIC AND INDUSTRY THAT MY PREFERENCE WOULD BE TO SELECT ONE DESIGN AND TO STANDARDIZE THE INDUSTRY USING THAT DESIGN. I HAVE COME TO REALIZE THAT IN OUR CIVILIAN NUCLEAR INDUSTRY THERE IS PROBABLY A NEED FOR MORE THAN ONE STANDARD DESIGN. THE NAVY, RECOGNIZING THAT DIFFERENT SHIPS AND MISSIONS DEMAND DIFFERENT DESIGNS, REACHED A SIMILAR CONCLUSION. LIKEWISE, UTILITIES CAN HAVE SOMEWHAT DIFFERING NEEDS AND AS A PRACTICAL MATTER, THERE SHOULD BE AVAILABLE A FEW STANDARD NUCLEAR PLANT DESIGNS SO THERE WOULD BE A CHOICE. I THINK THAT EACH VENDOR SHOULD SELECT THEIR BEST DESIGN, PERHAPS AN ENHANCED EXISTING DESIGN, AND SUBMIT THAT DESIGN FOR THE NRC TO REVIEW AND APPROVE. I ENVISION THAT THE DESIGN THEN WOULD BE THE SUBJECT OF A COMMISSION RULEMAKING TO CERTIFY THE DESIGN FOR USE BY REFERENCE IN AN APPLICATION FOR A LICENSE TO CONSTRUCT AND OPERATE A NUCLEAR PLANT. EACH VENDOR MIGHT EVEN HAVE TWO DESIGNS THAT ARE OF DIFFERENT POWER RATINGS AND EACH DESIGN WOULD BE AS COMPLETE AS POSSIBLE AT THE TIME THAT THE COMMISSION CONDUCTS THE RULEMAKING PROCEEDINGS. THE

PUBLIC WOULD BE ABLE TO PARTICIPATE IN THE RULEMAKING AND THE COMMISSION WOULD ONLY CERTIFY A DESIGN FOLLOWING A COMPLETE AND THOROUGH REVIEW.

NRC CERTIFIED DESIGNS COULD THEN BE UTILIZED AT PRESELECTED SITES, WHICH HAD BEEN SELECTED FOR POWER PLANT USE, AND WHICH WERE SELECTED ON THE BASIS OF A FORMAL PUBLIC PARTICIPATION PROCESS. THIS ALLOWS FOR MORE MEANINGFUL PUBLIC PARTICIPATION AND FOR EVALUATION OF AN ESSENTIALLY COMPLETE DESIGN AND DESIGN-SITE INTERFACE CONSIDERATIONS BEFORE CONSTRUCTION BEGINS. FOLLOWING THIS PROCESS EARLY ON SHOULD ENHANCE RESOLVING ISSUES IN THE MOST EFFECTIVE MANNER AND WITHOUT THE LINGERING UNCERTAINTY CAUSED BY OUR PRESENT TWO-STEP PROCESS. THIS PROCESS OF ONE-STEP LICENSING, USING A COMBINED CP/OL APPROACH, SHOULD RESULT IN RESOLVING THE MAXIMUM NUMBER OF ISSUES EARLY, SO THAT CONSTRUCTION WOULD BE MORE ORDERLY AND LESS SUBJECT TO CHANGE AND MODIFICATION.

THE NRC WOULD CONTINUE TO MONITOR CONSTRUCTION ACTIVITIES AND ENSURE THAT PLANTS WERE PROPERLY CONSTRUCTED AS WE DO NOW, THROUGH THE INSPECTION AND TESTING PROCESS. THE COMMISSION WOULD STILL PROVIDE THE NECESSARY REVIEW AND APPROVAL PRIOR TO OPERATION, ALTHOUGH THERE WOULD NO LONGER BE A MANDATORY FORMAL HEARING AT THIS STAGE. THE COMMISSION COULD, HOWEVER, AT ITS

DISCRETION, CONDUCT A HEARING, IF IN ITS VIEW, ANY SIGNIFICANT ISSUE REQUIRED IT.

WHILE SOME OF THESE CHANGES I HAVE OUTLINED COULD BE ADMINISTRATIVELY IMPLEMENTED BY THE NRC, THE OVERALL BENEFITS OF STANDARDIZATION AND RELATED REFORM CANNOT IN MY VIEW BE FULLY ACHIEVED WITHOUT THE RELATED CONGRESSIONAL STAMP OF APPROVAL. I BELIEVE THAT CONGRESSIONAL ACTION IS NECESSARY TO PROVIDE THE REQUIRED STABILITY AND CONFIDENCE THAT THIS IS NATIONAL POLICY IF THE MAXIMUM BENEFITS OF STANDARDIZATION ARE TO BE ACHIEVED.

QUESTION 16: COMMISSIONER ZECH, THE SECRETARY OF ENERGY HAS JUST EXPLAINED TO THE COMMITTEE THE NEED FOR LEGISLATION IN ORDER TO INSTITUTE A FUNCTIONAL AND RELIABLE LICENSING REFORM PROCESS AT THE NRC, ONE THAT THE NUCLEAR INDUSTRY AND FINANCIAL MARKETS WILL BELIEVE IN. WOULD YOU SHARE WITH THIS COMMITTEE YOUR OPINION OF WHY LEGISLATION IS NECESSARY BEFORE NUCLEAR POWER IS AGAIN A VIABLE OPTION FOR UTILITIES IN THE U.S.?

ANSWER.

THE ATOMIC ENERGY ACT OF 1954, AS AMENDED, PROVIDES FOR A TWO-STEP LICENSING PROCESS FOR NUCLEAR POWER PLANTS. THE FIRST STEP, WITH A MANDATORY PUBLIC HEARING, MUST PRECEDE CONSTRUCTION OF THE PLANT. PRIOR TO FUEL LOADING AND COMMENCEMENT OF OPERATION, THE NRC MUST GRANT AN NRC OPERATING LICENSE AUTHORIZING THESE ACTIVITIES. THIS SECOND STEP IS PRECEDED BY AN OPPORTUNITY FOR PUBLIC HEARING BY PERSONS WHOSE INTEREST MAY BE AFFECTED BY THE PROCEEDING.

FOR MANY YEARS THE CONSISTENT PRACTICE HAS BEEN THAT THE PROCEEDING AT EACH OF THE LICENSING STEPS IS A FORMAL ADJUDICATORY PROCEEDING; A TRIAL, IF YOU WILL. IT IS UNDERSTANDABLE WHY THE PROCEEDING AT THE OUTSET SHOULD ENCOURAGE THE MAXIMUM PUBLIC PARTICIPATION AND INVOLVEMENT.

QUESTION 16. (CONTINUED) - 2 -

AFTER THE PLANT HAS BEEN SUBSTANTIALLY CONSTRUCTED, THE TWO-STEP LICENSING PROCESS, AS IT HAS BEEN IMPLEMENTED ADMINISTRATIVELY OVER THE YEARS, PROVIDES ANOTHER OPPORTUNITY FOR A FORMAL ADJUDICATORY PROCEEDING. IT IS DIFFICULT TO ANTICIPATE WHAT ISSUES CAN BE RAISED AT THE SECOND PROCEEDING AND HOW LONG IT WILL TAKE TO RESOLVE THEM. ONE THING IS CERTAIN. EVEN THOUGH A PLANT HAS BEEN COMPLETED AND IS OTHERWISE THOUGHT TO BE READY FOR OPERATION, IT CANNOT BE LICENSED TO OPERATE UNTIL THE ADJUDICATORY PROCEEDING HAS BEEN COMPLETED.

I CERTAINLY SUPPORT RESPONSIBLE PUBLIC PARTICIPATION AND AWARENESS OF ALL CIRCUMSTANCES RELATING TO THE CONSTRUCTION AND OPERATION OF A NUCLEAR POWER PLANT WHICH COULD AFFECT THE INTERESTS OF MEMBERS OF THE PUBLIC. I BELIEVE THAT AS MUCH OF THE DEBATE ON ISSUES AS POSSIBLE SHOULD BE ACCOMPLISHED AT THE EARLIEST OPPORTUNITY (BEFORE A LICENSE IS ISSUED TO CONSTRUCT A PLANT AT A PARTICULAR SITE). I BELIEVE THAT GENERAL DEBATE IN AN ADMINISTRATIVE TRIAL ON ISSUES AFTER THE PLANT HAS BEEN CONSTRUCTED IS CERTAINLY NOT BENEFICIAL TO THE UTILITY AND WOULD NOT APPEAR TO BEST SERVE PUBLIC INTEREST. FIRST AND FOREMOST, THE NRC MUST ASSURE THAT A NUCLEAR PLANT WILL BE OPERATED SO AS TO PROVIDE ADEQUATE PROTECTION OF THE PUBLIC HEALTH AND SAFETY. THIS MUST BE OUR CONTINUING CONCERN.

QUESTION 16. (CONTINUED) - 3 -

WHETHER THE LEGISLATION, IF ENACTED, WOULD RESULT IN NUCLEAR POWER BECOMING A VIABLE OPTION IS A DIFFICULT QUESTION. MANY FACTORS ENTER A UTILITY'S DECISION TO BUILD A NUCLEAR POWER PLANT. I CAN ONLY SPEAK TO THOSE WHICH ARE WITHIN THE NUCLEAR REGULATORY COMMISSION'S AREA OF RESPONSIBILITY. LEGISLATION IS NEEDED, IT SEEMS TO ME, IF WE ARE TO PROVIDE THE REGULATORY ENVIRONMENT WHICH WOULD ENCOURAGE THE INDUSTRY TO MOVE IN THE DIRECTION OF STANDARDIZED DESIGNS. IF INDUSTRY REMAINS AWARE THAT, UNDER THE LONG-STANDING TWO-STEP PROCESS, DECISIONS AT THE FIRST STEP ARE LIKELY TO BE CHALLENGED IN FORMAL PROCEEDINGS AT THE SECOND STEP, WE ARE NOT LIKELY TO SEE A MOVE IN THE DIRECTION OF STANDARDIZED DESIGNS. I BELIEVE THAT SUCH MOVEMENT WILL IMPROVE RELIABILITY AND SAFETY OF PLANT OPERATIONS AND THAT REALLY IS THE ULTIMATE OBJECTIVE WE SHOULD BE SEEKING. THEREFORE, I AM CONFIDENT THAT BASICALLY A ONE-STEP APPROACH TO LICENSING IS NEEDED IN ORDER FOR STANDARDIZATION TO BE FULLY ACHIEVED BY LEGISLATION.

ALTHOUGH THE TWO-STEP PROCESS MAY HAVE BEEN WELL-SUITED FOR DEVELOPMENTAL REACTORS, I BELIEVE THAT WE SHOULD MOVE IN THE DIRECTION OF HAVING AS MUCH AS POSSIBLE DECIDED IN A ONE-STEP OR COMBINED CONSTRUCTION PERMIT/OPERATING LICENSE FOR THE LICENSING OF COMMERCIAL NUCLEAR PLANTS.

IN SUMMARY, LEGISLATION IS NEEDED TO CHANGE THE EXISTING STATUTORY TWO-STEP LICENSING PROCESS. IN MY JUDGMENT, AS LONG

AS THAT IS EMBEDDED IN OUR CHARTER, THERE PROBABLY WILL ALWAYS BE SOME RESERVATION ON INDUSTRY'S PART AS TO WHETHER STANDARDIZATION IN THE LONG RUN WILL BE WORTH THE INITIAL EFFORT. I STRONGLY BELIEVE THAT IT IS AND THAT IT WILL CONTRIBUTE TO SAFETY.

QUESTION 17. ON PAGE TWO OF YOUR WRITTEN TESTIMONY, YOU ARGUE THAT WITH "MATURATION OF THE INDUSTRY, IT IS NOW POSSIBLE TO DESCRIBE AND EVALUATE STANDARDIZED PLANT DESIGNS ON A GENERIC BASIS...." HOW CLOSE IS THE NUCLEAR INDUSTRY AT THIS POINT TO DEVELOPING THIS TYPE OF "STANDARDIZED" PLANT DESIGN? IF THE LEGISLATION WE ARE NOW CONSIDERING WERE TO BECOME LAW TOMORROW, WHEN WOULD YOU EXPECT TO RECEIVE YOUR FIRST APPLICATIONS FOR PRE-APPROVAL OF SUCH DESIGNS?

ANSWER.

PRESENTLY, THE STAFF HAS TWO SUCH REFERENCE SYSTEM DESIGN REVIEWS ONGOING: GENERAL ELECTRIC'S GESSAR II AND WESTINGHOUSE'S RESAR-SP/90. THE STAFF ALSO EXPECTS, IN THE NEAR FUTURE, THAT COMBUSTION ENGINEERING AND GENERAL ELECTRIC WILL PURSUE DESIGN APPROVALS FOR CESSAR AND THE ADVANCE BWR DESIGNS, RESPECTIVELY.

COMMISSIONER ASSELSTINE ADDS: IT WILL LIKELY BE SEVERAL YEARS BEFORE TRULY ADVANCED DESIGNS ARE PRESENTED TO THE COMMISSION FOR APPROVAL. THE EPRI REVIEW WHICH IS NOW UNDERWAY WILL PROBABLY NOT LEAD TO ADVANCED DESIGN PROPOSALS UNTIL THE EARLY 1990'S.

QUESTION 18. HOW MANY COMPANIES ACTUALLY DESIGN COMMERCIAL NUCLEAR PLANTS? DO YOU BELIEVE THIS NUMBER MIGHT CHANGE AS A RESULT OF THIS LEGISLATION? WOULD POTENTIAL REDUCTIONS IN COMPETITION HAVE AN EFFECT ON SAFETY?

ANSWER.

PRESENTLY THERE ARE THREE U.S. COMPANIES THAT DESIGN COMMERCIAL LIGHT WATER NUCLEAR POWER PLANTS: GENERAL ELECTRIC CO., WESTINGHOUSE ELECTRIC CORP. AND COMBUSTION ENGINEERING, INC. IN ADDITION, GA TECHNOLOGIES DESIGNS HIGH TEMPERATURE GAS COOLED REACTORS. IT IS EXPECTED THAT THIS NUMBER WILL REMAIN CONSTANT AT LEAST UNTIL THE UTILITY INDUSTRY STARTS PLACING NEW ORDERS FOR NUCLEAR POWER PLANTS.

A REDUCTION IN INDUSTRY COMPETITION WOULD NOT HAVE A DETRIMENTAL EFFECT ON SAFETY. THE NRC'S GENERAL DESIGN CRITERIA AND REGULATIONS ARE NOT BASED ON INDUSTRY COMPETITION.

QUESTION 19. ON PAGE SIX OF YOUR WRITTEN TESTIMONY, YOU SAY THAT BECAUSE THE NRC HAS NOT "RECENTLY COMPLETED A REVIEW OF A LICENSE APPLICATION FOR A BREEDER REACTOR OR A REPROCESSING PLANT" YOU WOULD BE RELUCTANT TO RECOMMEND STREAMLINED LICENSING PROCEDURES FOR THEM. SINCE YOU STATE THAT NO NEW POWER REACTORS HAVE BEEN ORDERED FOR "SEVERAL YEARS", WHY DO WE NOW GO FORWARD WITH PLANS FOR STREAMLINED LICENSING PROCEDURES FOR THEM?

ANSWER.

THE NRC HAS HAD MORE THAN 30 YEARS' EXPERIENCE IN LICENSING LIGHT WATER POWER REACTOR (LWR) DESIGNS. HOWEVER, IT HAS ONLY LIMITED EXPERIENCE RELATED TO LICENSING OF BREEDER REACTORS AND REPROCESSING PLANTS. THEREFORE, LACKING AN APPROPRIATE EXPERIENCE BASE FOR LICENSING, THE COMMISSION WOULD NOT INCLUDE BREEDER REACTORS OR REPROCESSING PLANTS THE PROVISIONS OF THE BILL. HOWEVER, THE CURRENT HIATUS IN NEW POWER REACTOR ORDERS IS AN OPPORTUNE TIME FOR DEVELOPING AND IMPLEMENTING NEEDED REFORMS IN THE LICENSING PROCESS.

QUESTION 20. WHAT WOULD BE YOUR REACTION TO A PROPOSAL TO CHANGE THE NRC SO AS TO TURN IT INTO A SINGLE ADMINISTRATOR AGENCY SIMILAR TO THE ENVIRONMENTAL PROTECTION AGENCY (EPA) OR THE VETERANS' ADMINISTRATION (VA)?

ANSWER.

COMMISSIONER ASSELSTINE'S TESTIMONY BEFORE THE SUBCOMMITTEE ON NUCLEAR REGULATION OF THE SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS EXPLAINS HIS POSITION ON THIS ISSUE IN SOME DETAIL. A COPY IS ATTACHED.

STATEMENT BY COMMISSIONER JAMES K. ASSELSTINE

BEFORE THE

SUBCOMMITTEE ON NUCLEAR REGULATION
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

JUNE 17, 1986

Mr. Chairman, I take a somewhat different view of three bills being considered by the Subcommittee than does the Commission majority. I favor retention of the Commission form of organization and therefore do not support restructuring the NRC as an agency headed by a single administrator as proposed in S. 1235. However, I believe that the Commission, the Congress and the public would all benefit from the establishment of a Nuclear Safety Board and a statutory Inspector General. I therefore support enactment of S. 2291 and S. 2471 with some modifications, which I will describe in a few moments.

At the outset, Mr. Chairman, I think it is worth taking a careful look at just what the Commission majority is proposing. The majority favors the establishment of a single administrator, but with no independent safety review group and with no Inspector General. That would be a very different decisionmaking process than we have today. Decisions on major policy issues would be made in private without the benefit of the exchange of differing viewpoints and with reduced public involvement or observation. There would be no independent group to serve as a check on the industry's and the agency's safety performance, to review operating experience at the plants and to investigate accidents and serious operating events at our licensed facilities. There would be no independent source of advice to th

Congress on the current state of nuclear safety and the adequacy of the federal regulatory program. And, unlike virtually every other single-administrator agency in the government, there would be no independent watchdog to police internal agency misconduct. Finally, the majority advocates streamlining the licensing process for future nuclear powerplants by substituting a discretionary hearing for the present right to a hearing by interested members of the public prior to plant operation. This change would allow the Commission broad discretion to reject hearing requests prior to plant operation on such issues as emergency planning, quality assurance and readiness for operation. Given the Commission's past reluctance to grant discretionary hearings -- only one has been granted and it ended in the Commission's rejection of all of the NRC technical staff's proposed safety improvements for the plant -- as a practical matter this probably means an end to hearings on these issues of greatest interest to the public. The upshot of all this would be a much more closed system, with little debate and public ventilation of nuclear safety issues, with less technical oversight of the agency's and the industry's performance, and with substantially reduced public involvement.

Mr. Chairman, I believe that such a system is fundamentally at odds with the plan envisioned by the Congress in 1954, when it gave the responsibility for nuclear safety regulation to a Commission. It is worth remembering that the 1954 Act struck an important bargain. The states were pre-empted from safety regulation of nuclear powerplants. But in return, there was to be an open federal regulatory process. The broad public policy issues associated with nuclear regulation were to be considered by a multi-member

Commission, composed of individuals with different backgrounds, experience, training, and views on the issues. The views of the members of the Commission were to be available not only within the collegial decisionmaking process but also to the Congress and to the public. The public was to be involved extensively throughout the process, and they were to be given a right to a hearing on each valid safety issue and to have that issue resolved by a group of independent judges separate from the NRC technical staff. If the Congress intends to restructure the NRC in a manner that will sharply reduce the benefits to the public and the states provided by the 1954 Act, as the majority now recommends, then perhaps it is also time to reconsider the other side of the balance that was struck in 1954. Specifically, it may be appropriate to restore to the states the authority to set and enforce their own safety requirements for the facilities provided that those standards meet or exceed the minimum federal standards.

Mr. Chairman, the majority offers several arguments in support of the single administrator form, and I would like to address each one briefly. First, the majority argues that a single administrator will result in more efficient management and decisionmaking than does the Commission form. I do not believe this is necessarily the case. In fact, a comparison of the performance of the NRC with the two other single-administrator agencies with nuclear responsibilities, DOE and EPA, would seem to indicate that the Commission is at least as efficient in management and decisionmaking. The Commission has been far ahead of EPA, for example, in promulgating its technical requirements for high-level radioactive waste disposal, low-level waste disposal and uranium mill tailings. Similarly, the Commission was able to carry out its responsibilities for the site selection guidelines for the high-level waste repository much faster than was DOE. On the basis of actual experience, I would argue that the Commission form is not necessarily more inefficient than the single administrator. Nor do I see significant delays in Commission decisionmaking. Where delays occur, it is invariably because the issues are complex and the choices are far from clear. Such difficult decisions take time, whether they are being considered by a single administrator or a Commission.

Second, the majority contends that the Commission form is cutdated, and is ill-suited to the oversight of 100 operating nuclear powerplants. Implicit in this statement is the argument that the Commission no longer faces the types of broad public policy issues that benefit from full and open discussion by a multi-member group with differing viewpoints. I do not believe this is the case. In recent years, the Commission has considered or is in the process of considering a broad range of safety issues, including:

- the adequacy of safety at the Indian Point plants;
- the Commission's severe accident policy;
- the Commission's requirements for backfitting new safety features on existing plants;
- the radioactive source term from a severe accident;

- safety goals for assuring the safety adequacy of current and future plants;
- the adequacy of emergency planning requirements;
- the Commission's confidence that permanent waste disposal facilities will be available when needed;
- the soundness of our enforcement policy; and
- reactor decommissioning to name just a few.

Each of these is a major policy issue that is particularly well suited to consideration by a multi-member Commission, and I expect that we will continue to be faced with such issues in the future.

Although I am sure that the NRC would benefit from greater management attention in the oversight of the 100 operating plants, I believe that this can be readily accomplished with the Commission form. For example, there is nothing to prohibit the Chairman from taking a more active and direct role in assuring that the NRC staff carries out the regulatory policies established by the Commission. I believe that Commissioner Zech intends to have a more active management role as Chairman, and I welcome that. So long as he does not attempt to alter Commission policy or make policy decisions on his own, there is nothing to prevent the Chairman from taking a more active role in the day-to day management of the staff. Indeed, such an approach provides for improved management oversight while at the same time retaining the benefits of Commission consideration of the broad public policy issues that routinely come before this agency. I might add that no additional legislation is needed for the Chairman to carry out this management role. Trying this approach, in my view, is preferable to replacing the Commission form with a single administrator.

The remaining two reasons given by the majority in support of the single administrator are more troubling to me. The majority argues that existence of differing Commission views on the issues can confuse the staff and the public, and the majority objects to being required to hold its deliberations in public, as required by the Government in the Sunshine Act. I should note that the latter objection goes far beyond previous Commission statements in favor of some limited authority to hold private discussions to exchange preliminary thoughts on issues before the Commission. I am not impressed by either of these arguments. I believe that the Congress and the public benefit from hearing different views and perspectives on the significant policy issues before the Commission. Rather than confusing the public and the staff, they assure that different viewpoints are heard and considered. As for the Sunshine Act, whatever the merits of some limited preliminary discussions in private, the actual debate on the principal safety issues facing the NRC should take place in public. Why should the states, that have been pre-empted from setting safety standards for nuclear reactors, also be pre-empted from the Federal deliberative process for setting safety standards or for assessing the public health and safety significance of operating events and accidents? To give just one example, in the aftermath of the Chernobyl accident, the public is most concerned with whether we can expect to see a core meltdown in the United States in the foreseeable future, what the chances are that such an accident could lead to large offsite releases of radiation, whether the Commission views the present level of risk to be acceptable, and if not, what we are doing to reduce it. These are the kinds of issues that the Commission should address openly and in a public forum. Instead, the Commission seems to be arguing for the need to consider these and all other safety issues affecting the public in private.

Mr. Chairman, I also do not believe that a single administrator form is in the industry's best interests. The industry continually argues for the need for improved regulatory stability and predictability, given the fact that ten years or more are needed to build the plants, and the plants are expected to operate for 30-40 years. With a Commission, major policy changes tend to occur gradually, since turnover among individual Commissioners is staggered. With a single administrator, large changes in policy and direction can occur quite rapidly, often with drastic consequences for the regulated industry. I think the experiences of recent years with EPA and the Department of the Interior are good examples. One should consider whether this industry, with its particular need for predictability and stability, would be best served by a regulatory system that is subject to wide and rapid fluctuations.

On the subject of the Nuclear Safety Board, I believe that an independent safety board is needed to assure that we and the industry learn the crucial lessons of operating experience at the plants. Although improvements have been made in recent months in our ability to investigate serious operating events, our capability to seek out and correct the root causes of these events is still inadequate. Despite two investigations of the Davis-Besse event last year, including one involving some people from outside the NRC, we still do not have a clear understanding of the root causes of that event, including particularly the contributions of management attitudes and practices by the licensee's senior management and the role of the NRC staff is not bringing about effective corrective action early on. The same is true for the Rancho Seco event last year, which raises even more serious questions about the NRC's past performance in regulating the Babcock and Wilcox reactors. It is simply not realistic to expect that the NRC will be able to evaluate in a critical and objective manner its own past performance. A Nuclear Safety Board would provide the necessary independence and objectivity. To avoid the proliferation of advisory groups, I would abolish the Advisory Committee on Reactor Safeguards. In view of the decline in the Commission's licensing caseload and the increasing importance of operating experience at the plants, I believe the Commission, the Congress and the public would be better served by adding a Nuclear Safety Board and by eliminating the ACRS.

Finally, Mr. Chairman, I believe that a statutory Inspector General to police internal agency misconduct would be a benefit. It would provide much-needed credibility to our internal process for identifying and dealing with employee misconduct, and might improve our somewhat strained relationship with the Department of Justice. I also see no need for direct

Commission control of the functions of such an internal investigative office. Indeed, the Inspector General system seems to work quite well in the many agencies now subject to this system. I note that S. 2471 also gives certain safety review and oversight responsibilities to the Inspector General. I believe that these functions are best carried out by the Nuclear Safety Board, and therefore I would delete these provisions.

QUESTION 21. WOULD THIS BILL REQUIRE THAT PLANTS THAT RECEIVE A COMBINED CONSTRUCTION-OPERATING PERMIT MEET THE SAME STANDARDS AS PLANTS THAT RECEIVE A CONSTRUCTION AND OPERATING PERMIT UNDER THE PRESENT SCHEME? IF NOT, WHY NOT?

ANSWER.

YES. HOWEVER, THE REQUIREMENTS WOULD HAVE TO BE MET AT AN EARLIER STAGE (CP STAGE) FOR A COMBINED CONSTRUCTION PERMIT/OPERATING LICENSE. OF COURSE, CERTIFICATION THAT A PLANT HAD BEEN BUILT IN ACCORD WITH NRC REQUIREMENTS COULD NOT BE PART OF THE CP-OL REVIEW PROCESS. HOWEVER, UNDER PROPOSED SECTION 185(b) ADOPTED BY A MAJORITY OF THE COMMISSION, THE COMMISSION ITSELF WOULD HAVE TO MAKE AN AFFIRMATIVE FINDING TO THAT EFFECT PRIOR TO APPROVING FULL POWER OPERATIONS.

QUESTION 22. WOULD THIS BILL GUARANTEE PERSONS LIVING NEAR A PLANT A HEARING ON ADEQUACY OF CONSTRUCTION, READINESS FOR OPERATION AND APPROPRIATENESS OF EMERGENCY PLANNING BEFORE THE PLANT OPERATES? IF NOT, WHY NOT?

ANSWER.

WHILE THE PROPOSED BILL DOES NOT GUARANTEE THAT A HEARING WILL BE HELD TO RESOLVE CONCERNS RAISED BY THE PUBLIC REGARDING ISSUES SUCH AS ADEQUACY OF CONSTRUCTION OR EMERGENCY PREPAREDNESS, IT DOES PROVIDE THE OPPORTUNITY FOR THE PUBLIC TO REQUEST A HEARING ON THOSE ISSUES, PROVIDED THAT THE REQUIREMENTS SET FORTH IN S.2073 ARE MET.

ALSO SEE LAST PARAGRAPH OF ANSWER TO QUESTION 8.

COMMISSIONER ASSELSTINE ADDS: I WOULD NOTE THAT THE OPPORTUNITY FOR A HEARING AT THE PREOPERATION STAGE WHICH IS PROVIDED BY S.2073 DIFFERS FROM THE OPPORTUNITY PROVIDED BY SECTION 189 OF THE ATOMIC ENERGY ACT FOR A HEARING PRIOR TO THE ISSUANCE OF AN OPERATING LICENSE. SECTION 189 PROVIDES A RIGHT TO A HEARING BEFORE AN OPERATING LICENSE IS ISSUED TO ANYONE WHO CAN ESTABLISH STANDING -- I.E., AN INTEREST WHICH WOULD BE AFFECTED BY OPERATION OF THE PLANT. S.2073 SETS AN EXTREMELY HIGH "GOOD CAUSE" STANDARD WHICH A PROSPECTIVE INTERVENOR MUST MEET IN ORDER TO REQUEST A HEARING. THEN, EVEN IF THE INTERVENOR CAN MEET THAT STANDARD, THE COMMISSION

QUESTION 22. (CONTINUED) - 2 -

STILL HAS ALMOST TOTAL DISCRETION TO REFUSE TO HOLD A HEARING IF THE COMMISSION FINDS THAT THE ISSUE DOES NOT CONSIST OF "A SUBSTANTIAL DISPUTE OF FACT, NECESSARY FOR THE COMMISSION'S DECISION, THAT CANNOT BE RESOLVED WITH SUFFICIENT ACCURACY EXCEPT AT A HEARING."

QUESTION 23. WHAT DOES THIS BILL DO TO HASTEN RESOLUTION OF THE NUMEROUS OUTSTANDING SPECIFIC AND GENERIC SAFETY ISSUES THAT ARE NOW UNRESOLVED AND ROUTINELY DEFERRED IN THE PRESENT LICENSING PROCESS?

ANSWER.

THIS BILL DOES NOT SPECIFICALLY ADDRESS HASTENING OF THE PROCESS OF RESOLVING SPECIFIC AND GENERIC SAFETY ISSUES THAT ARE NOW UNRESOLVED AND ROUTINELY DEFERRED IN THE PRESENT LICENSING PROCESS. HOWEVER, THE NRC POLICY STATEMENT ON SEVERE REACTOR ACCIDENTS REGARDING FUTURE DESIGNS AND EXISTING PLANTS (50 FR 32138) INCLUDES DECISIONS ON SEVERE ACCIDENT ISSUES IN NUCLEAR POWER PLANT REGULATION AND CONTAINS CRITERIA AND PROCEDURAL REQUIREMENTS THAT THE COMMISSION BELIEVES A NEW DESIGN FOR A NUCLEAR POWER PLANT SHOULD MEET TO BE ACCEPTABLE FOR SEVERE ACCIDENT CONCERNS. ONE CRITERION AND PROCEDURAL REQUIREMENT IS THE DEMONSTRATION OF TECHNICAL RESOLUTION OF ALL APPLICABLE UNRESOLVED SAFETY ISSUES AND THE MEDIUM-PRIORITY AND HIGH-PRIORITY GENERIC SAFETY ISSUES.

QUESTION 24. WHAT WOULD THIS BILL DO TO SHIFT THE FOCUS OF LICENSING FROM A CONTEST BETWEEN LAWYERS TO AN ENGINEERING DETERMINATION OF SAFETY?

ANSWER.

BY ALLOWING FOR ADVANCE GENERIC APPROVAL OF STANDARDIZED NUCLEAR POWER PLANT DESIGNS, THE PROPOSED BILL PROVIDES THE OPPORTUNITY FOR ONE PROCEEDING FOCUSED ON FACTUAL SCIENTIFIC AND ENGINEERING DISPUTES REGARDING THE STANDARDIZED DESIGN. THE PROPOSED BILL SHOULD SUBSTANTIALLY REMOVE LEGAL DISPUTES RELITIGATING DESIGN ISSUES PREVIOUSLY RESOLVED AT ANY SUBSEQUENT HEARINGS WHICH MAY BE HELD OVER THE USE OF THAT STANDARDIZED DESIGN AT A COMBINED CONSTRUCTION PERMIT/OPERATING LICENSE HEARING.

QUESTION 25. CAN THE NUCLEAR LICENSING PROCESS BE REFORMED IN AN EFFECTIVE WAY WITHOUT REFORMING THE STRUCTURE OF THE COMMISSION? FOR EXAMPLE, SHOULDN'T THE AGENCY HAVE AN ADMINISTRATOR WHO IS RESPONSIBLE TO CONGRESS AND THE PRESIDENT AND WHO CAN MANAGE THE VERY LARGE NRC STAFF?

ANSWER.

THE LICENSING PROCESS CANNOT BE EFFECTIVELY REFORMED WITHOUT LEGISLATION WHICH ENCOURAGES STANDARDIZATION AND PROVIDES FOR STRUCTURAL CHANGES IN THE LICENSING PROCESS. LEGISLATION WHICH WOULD CHANGE THE NRC INTO AN AGENCY HEADED BY A SINGLE ADMINISTRATOR WOULD NOT BY ITSELF CURE THE ILLS OF THE CURRENT LICENSING PROCESS. HOWEVER, THE COMMISSION BELIEVES THAT THE AGENCY COULD BE BETTER MANAGED IF THE NRC WERE RECONSTITUTED AS A SINGLE ADMINISTRATOR AGENCY. ACCORDINGLY, THE COMMISSION ENDORSES RECONSTITUTION OF THE AGENCY.

COMMISSIONER ASSELSTINE ADDS: COMMISSIONER ASSELSTINE'S TESTIMONY BEFORE THE SUBCOMMITTEE ON NUCLEAR REGULATION OF THE SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS EXPLAINS HIS POSITION ON THIS ISSUE IN SOME DETAIL.

QUESTION 26. WHAT PLACE DOES THE COLLEGIAL STRUCTURE OF THE COMMISSION HAVE IN DETERMINING MATTERS OF SAFETY?

ANSWER.

A COLLEGIAL STRUCTURE PROVIDES SOME ADDED ASSURANCE THAT A DIVERSE RANGE OF VIEWS ARE CONSIDERED BEFORE A SAFETY ISSUE IS RESOLVED. HOWEVER, WITH A COLLEGIAL BODY THE DECISION-MAKING PROCESS IS OFTEN PROLONGED AND, SOME DECISIONS ARE NOT AS CLEAR AS THEY MIGHT BE WITH A SINGLE ADMINISTRATOR.

COMMISSIONER ASSELSTINE ADDS: COMMISSIONER ASSELSTINE'S TESTIMONY BEFORE THE SUBCOMMITTEE ON NUCLEAR REGULATION OF THE SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS EXPLAINS HIS POSITION ON THIS ISSUE IN SOME DETAIL.

QUESTION 27. WHAT IS YOUR OPINION OF SENATOR BIDEN'S SUGGESTION, CONTAINED IN THE BILL, S. 2291, HE RECENTLY INTRODUCED, THAT AN INDEPENDENT NUCLEAR SAFETY BOARD BE ESTABLISHED, WHICH WOULD REVIEW NUCLEAR INCIDENTS AND MAKE DETERMINATIONS ABOUT SCIENTIFIC AND ENGINEERING ASPECTS OF THOSE INCIDENTS?

ANSWER.

IN CONJUNCTION WITH THE FY 1985 NRC APPROPRIATIONS ACT, CONGRESS REQUIRED THAT THE NRC CONDUCT A STUDY OF THE NEED FOR AND FEASIBILITY OF AN INDEPENDENT ORGANIZATION RESPONSIBLE FOR CONDUCTING INVESTIGATIONS OF SIGNIFICANT SAFETY EVENTS AT NRC-LICENSED FACILITIES. THE NRC CONTRACTED WITH THE BROOKHAVEN NATIONAL LABORATORY (BNL) TO CONDUCT THE STUDY.

BNL RECOMMENDED THE ESTABLISHMENT OF A STATUTORY OFFICE OF NUCLEAR SAFETY HEADED BY A DIRECTOR REPORTING TO THE COMMISSIONERS. HOWEVER, BNL CONCLUDED THAT, IN GENERAL, THE NRC INVESTIGATIONS OF OPERATIONAL EVENTS HAVE BEEN CONDUCTED IN A "PROFICIENT AND TECHNICALLY COMPETENT" MANNER. FURTHER, BNL FOUND NO INDICATION OF BIAS IN THE NRC INVESTIGATIONS EXAMINED AS PART OF THE STUDY. WHILE BNL SUGGESTED A NUMBER OF IMPROVEMENTS FOR EVENT INVESTIGATIONS, THEY NOTED THAT, FOR THE MOST PART, THESE IMPROVEMENTS COULD BE IMPLEMENTED WITHIN THE PRESENT ORGANIZATIONAL STRUCTURE. MANY OF THE ADOPTED IMPROVEMENTS RECOMMENDED BY BNL HAVE SUBSEQUENTLY BEEN ADOPTED IN THE NEWLY ESTABLISHED AND SUCCESSFUL NRC INCIDENT INVESTIGATION PROGRAM (IIP).

RATHER THAN CORRECTING AN EXISTING DEFICIENCY, THE "NEED" OR JUSTIFICATION FOR A NUCLEAR SAFETY BOARD SEEMS TO REST ALMOST ENTIRELY UPON A PERCEIVED NEED TO MINIMIZE OR ELIMINATE ANY POTENTIAL CONFLICT OF INTEREST IN ORDER TO GAIN INCREASED PUBLIC, MEDIA, AND CONGRESSIONAL CONFIDENCE IN THE INVESTIGATORY PROCESS AND IN THE PERFORMANCE OF THE NUCLEAR INDUSTRY. IT IS REASONED THAT AN INDEPENDENT NUCLEAR SAFETY BOARD WOULD INCREASE CONFIDENCE IN THE INVESTIGATORY PROCESS BY RELIEVING THE NRC OF RESPONSIBILITY TO INVESTIGATE AND DETERMINE THE CAUSE OF AN EVENT TO WHICH THE NRC'S OWN REGULATORY AND COMPLIANCE ACTIVITIES MIGHT HAVE BEEN CONTRIBUTING FACTORS. THUS, THE DEGREE TO WHICH ONE SUPPORTS THE NEED FOR A NEW AND INDEPENDENT NUCLEAR SAFETY BOARD SEEMS TO BE A STRONG FUNCTION OF ONE'S CONFIDENCE OR LACK OF CONFIDENCE IN THE OBJECTIVITY, COMPETENCE, AND DEDICATION OF THE NRC TO FULFILL ITS RESPONSIBILITIES.

HOWEVER, UNDER S.2291, THE NUCLEAR SAFETY BOARD COULD DIRECT THE NRC TO PERFORM THE DESIRED INVESTIGATIONS AND THEN REVIEW THE RESULTS. THIS WOULD NOT CREATE THE PERCEPTION OF AN "INDEPENDENT

INVESTIGATION". ON THE OTHER HAND, IF THE NUCLEAR SAFETY BOARD WOULD CONDUCT ITS OWN INVESTIGATIONS, THEN THE RESOURCES CONTEMPLATED FOR THE BOARD WOULD NEED TO BE SUBSTANTIALLY AUGMENTED.

IT APPEARS THAT THE BOARD'S WORKLOAD COULD BE COMPARABLE TO THAT OF THE NATIONAL TRANSPORTATION SAFETY BOARD. BOTH ORGANIZATIONS WOULD HAVE PRIMARY RESPONSIBILITY FOR EVENT INVESTIGATION AND SPECIAL REPORTS. IN ADDITION, THE NUCLEAR SAFETY BOARD WOULD HAVE A NUMBER OF ADDITIONAL FUNCTIONS NOW BEING PERFORMED BY THE NRC.

THE CURRENT NTSB HAS APPROXIMATELY 320 EMPLOYEES AND ITS BUDGET IS IN EXCESS OF 22 MILLION DOLLARS.

WHILE WE ARE NOT SUGGESTING THAT NUCLEAR SAFETY BOARD BE GIVEN A STAFF OF 320, THE DESIRED INVESTIGATIVE RESULTS WOULD NOT BE OBTAINED BY TRANSFERRING THE 40-45 FULL-TIME EMPLOYEES CURRENTLY ASSIGNED TO NRC'S OFFICE FOR ANALYSIS AND EVALUATION OF OPERATIONAL DATA. EITHER THE RESOURCES ALLOCATED MUST BE SUBSTANTIALLY INCREASED OR THE EXPECTATIONS ABOUT RESULTS MUST BE SUBSTANTIALLY REDUCED.

A NUCLEAR SAFETY BOARD WOULD ALSO LIKELY LEAD TO A DUPLICATION OF EXISTING COMMISSION FUNCTIONS. FURTHER, THE BOARD'S ACTIVITIES MIGHT HINDER THE COMMISSION FROM ACTING EFFECTIVELY IN THE EVENT

OF AN INCIDENT, AND, IN ANY EVENT, THE BOARD COULD WELL BE PREEMPTED BY A PRESIDENTIAL COMMISSION IF THERE WERE A SIGNIFICANT ACCIDENT IN THE FUTURE.

BASED ON THE COMMISSION'S REVIEW OF THE BNL REPORT AND OTHER STUDIES OF THE ISSUE, THE COMMISSION BELIEVES THAT THERE ARE NO MAJOR DEFICIENCIES IN THE NRC ACCIDENT INVESTIGATION PROGRAM THAT WOULD WARRANT FORMATION OF AN INDEPENDENT NUCLEAR SAFETY BOARD.

COMMISSIONER ASSELSTINE ADDS:
MY TESTIMONY BEFORE THE SUBCOMMITTEE ON NUCLEAR REGULATION OF THE SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS EXPLAINS MY POSITION ON THIS ISSUE IN SOME DETAIL.

QUESTION 28. PLEASE PROVIDE THE COMMITTEE WITH SPECIFIC EXAMPLES OF BACKFITTING AT NUCLEAR PLANTS THAT YOU CONSIDER UNNECESSARY OR OVERLY COSTLY.

ANSWER.

WE BELIEVE THAT NO GENERIC BACKFITS PUT IN PLACE SINCE THE INCEPTION OF THE COMMITTEE TO REVIEW GENERIC REQUIREMENTS (CRGR) (NOVEMBER 1981) HAVE BEEN UNNECESSARY OR OVERLY COSTLY. FURTHER, PROPOSED PLANT-SPECIFIC BACKFITS HAVE BEEN SUBJECT TO CLOSER STAFF SCRUTINY WITH RESPECT TO BENEFIT AND COST SINCE EARLY 1984 AND WE BELIEVE THAT THERE HAVE BEEN NO INDIVIDUAL PLANT-SPECIFIC BACKFITS THAT WOULD BE CONSIDERED UNNECESSARY OR OVERLY COSTLY.

LOOKING AT BACKFITS COLLECTIVELY IN THE PERIOD FOLLOWING THE TMI-2 ACCIDENT, HOWEVER, AN NRC SURVEY OF THE INDUSTRY (REPORTED IN NUREG-0839, AUGUST 1981) FOUND THAT AS A GROUP, NEW REQUIREMENTS IMPOSED ON THE INDUSTRY WERE CAUSING "...A POTENTIAL SAFETY PROBLEM OF UNKNOWN DIMENSIONS." THIS FINDING IMMEDIATELY LEAD TO THE EXTENSIVE EFFORT BY THE COMMISSION TO ESTABLISH BETTER CONTROLS OVER THE PROCESSES FOR PROMULGATING NEW REQUIREMENTS. THE LAST STEP IN ESTABLISHING THOSE CONTROLS WAS TAKEN WITH THE ENACTMENT OF THE REVISED BACKFIT REGULATION 10 CFR 50.109, EFFECTIVE OCTOBER 21, 1985.

QUESTION 28. (CONTINUED) - 2 -

IN 1983, THE NRC ISSUED A REPORT THAT LISTED 482 GENERIC ISSUES OR "POSSIBLE DEFICIENCIES IN THE DESIGN, CONSTRUCTION OR OPERATION OF SEVERAL OR A CLASS OF NUCLEAR POWER PLANTS SUCH THAT THE PROTECTION OF THE PUBLIC FROM RADIATION MAY BE INADEQUATE." IN 1984, THE NRC REPORTED THAT IT HAS 12 MORE SERIOUS "UNRESOLVED SAFETY ISSUES," DEFINED AS ISSUES THAT "POSE IMPORTANT QUESTIONS CONCERNING THE ADEQUACY OF EXISTING SAFETY REQUIREMENTS... AND THAT INVOLVED CONDITIONS NOT LIKELY TO BE ACCEPTABLE OVER THE LIFETIME OF THE PLANTS AFFECTED." THE GAO HAS ESTIMATED THAT IT WILL TAKE THE NRC ABOUT 10 YEARS TO ELIMINATE THE BACKLOG OF UNRESOLVED ISSUES.

QUESTION 29. THE MARCH, 1985, REPORT OF THE NRC REGULATORY REFORM TASK FORCE FOUND THAT

> "THERE IS A SUBSTANTIAL AMOUNT OF EVIDENCE THAT THE (NRC) STAFF'S BACKFITTING PRACTICES WHICH HAVE COST CONSUMERS BILLIONS OF DOLLARS, HAVE MADE NUCLEAR PLANTS MORE DIFFICULT TO OPERATE AND MAINTAIN, HAVE INJECTED UNCERTAINTY AND PARALYZING DELAY INTO THE ADMINISTRATIVE PROCESS, AND IN SOME INSTANCES MAY HAVE REDUCED RATHER THAN ENHANCED PUBLIC SAFETY."

WOULD YOU PLEASE COMMENT ON THIS REPORT?

ANSWER.

THIS REPORT WAS BASED ON THE PERSONAL RESEARCH AND INSIGHTS OF THE REGULATORY REFORM TASK FORCE AND EXPRESSED ITS VIEWS. MOST OF THE BACKFIT ISSUES DISCUSSED IN THIS REPORT, AND IN PARTICULAR THE DUQUESNE LIGHT CO. ISSUES, APPEAR TO HAVE BEEN TREATED SATISFACTORILY BY BACKFIT MANAGEMENT PROCESSES PUT IN PLACE BEFORE, DURING, AND SUBSEQUENT TO THE REPORT.

QUESTION 29. (CONTINUED) - 2 -

THE NRC BEGAN WORK TO ADDRESS THE 1981 REPORT'S FINDINGS AND RECOMMENDATIONS THROUGH A SERIES OF CHANGES IN BACKFIT MANAGEMENT POLICY AND PROCEDURES. THE NEW BACKFIT REGULATION AND ASSOCIATED STAFF POLICY AND PROCEDURES ARE NOW BEING IMPLEMENTED.

QUESTION 30. PLEASE PROVIDE SPECIFIC EXAMPLES OF THE KIND OF UNNEEDED BACKFITTING THAT WOULD NOT OCCUR IF THIS BILL WERE ENACTED.

ANSWER.

SENATE BILL S.2073 WOULD ESSENTIALLY CODIFY THE COMMISSION'S BACKFIT REGULATION IN 10 CFR 50.109, BUT IS MUCH BROADER IN SCOPE THAN THE COMMISSION'S REGULATIONS SINCE IT WOULD APPLY TO ALL REGULATORY DECISIONS ON ANY SUBJECT. EVEN WITHOUT BROAD LEGISLATION, THE EXISTING TITLE 10 REGULATION WILL GOVERN THE NRC ACTIVITY TO PROPERLY MANAGE THE IMPOSITION OF CHANGES IN NUCLEAR POWER PRODUCTION FACILITIES IN THE INTERESTS OF PUBLIC SAFETY AND SECURITY. THEREFORE, IT IS NOT EXPECTED THAT UNNEEDED BACKFITS WILL OCCUR EVEN IF S.2073 IS NOT ENACTED. THE ENACTMENT OF S.2073, AS NOTED EARLIER IN OUR RESPONSE TO QUESTION NUMBER 10, WOULD SUBSTANTIALLY REMOVE OUR SUBSEQUENT FLEXIBILITY TO MAKE NEEDED ADJUSTMENTS IN OUR BACKFIT RULE ON THE BASIS OF EXPERIENCE.

QUESTION 31. DOES THE DOE BILL REQUIRE THE RESOLUTION OF THESE GENERIC SAFETY ISSUES PRIOR TO THE APPROVAL OF A STANDARDIZED PLANT DESIGN? IF NOT, HOW DOES THE STANDARDIZED PLANT DESIGN CONCEPT ADVANCE THE PROTECTION OF THE PUBLIC HEALTH AND SAFETY BEYOND THE PRESENT SYSTEM.

ANSWER.

NEITHER THE DOE NOR THE NRC BILL REQUIRES THE RESOLUTION OF GENERIC SAFETY ISSUES PRIOR TO THE APPROVAL OF A STANDARDIZED DESIGN. HOWEVER, THE COMMISSION'S POLICY STATEMENT ON SEVERE REACTOR ACCIDENTS REGARDING FUTURE DESIGNS AND EXISTING PLANTS (50 FR 32138) REQUIRES THAT FUTURE STANDARDIZED PLANT DESIGNS, AS WELL AS CUSTOM DESIGNS, DEMONSTRATE TECHNICAL RESOLUTION OF ALL APPLICABLE UNRESOLVED SAFETY ISSUES AND THE MEDIUM-PRIORITY AND HIGH-PRIORITY GENERIC SAFETY ISSUES.

Arizona Public Service Company
P.O. BOX 21666 • PHOENIX, ARIZONA 85036

KEITH TURLEY
CHAIRMAN AND CHIEF EXECUTIVE OFFICER

May 19, 1986

The Honorable James A. McClure, Chairman
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

This is in reply to your letter dated May 7, which forwarded three questions relating to my testimony before your committee on April 22. As you requested, the responses to those questions are enclosed.

It was a pleasure to have had the opportunity to appear before your committee and I want to thank you for the outstanding support you have given to the nuclear industry.

Sincerely,

Keith Turley

KT/kc
Enclosure

ANSWERS TO POST-HEARING QUESTIONS KEITH L. TURLEY

1. As I related in my testimony, Combustion Engineering offers a standard nuclear steam supply system with a Final Design Approval (FDA). It's called "System 80" and we selected it for all three of our Palo Verde nuclear units. The important distinction to be made here however is that while the System 80 has what the NRC calls a "Final Design Approval" (FDA) from the NRC staff; it does not have a design license from the Commission as envisioned in S. 2073. The critical difference boils down to the fact that a staff document - the FDA - is not binding on the NRC in future license applications. In fact, when our Palo Verde Unit 2 was awarded its full power operating license, the commissioners themselves noted that the design would probably not be approved for a plant seeking a construction permit today.

The commercial nuclear electric utility industry needs to see an expedited licensing process acceptable to the public and to Congress which would allow and instruct the NRC in the licensing and approval of standardized plants. I believe S. 2073 goes a long way toward achieving that objective. We need to include in this process the nuclear steam supply system as well as those critical areas in the "balance-of-plant" (BOP) which need to be part of the overall package.

There are essentially three needs for legislation. First, as I remarked in my prepared testimony, there is a significant difference between standardization per se and pre-approved standardization. Arizona Public Service has already, without legislation, achieved a measure of standardization by a "cookie cutter" approach to replicating our Palo Verde units. But this is really just single utility standardization; Palo Verde has no generic pre-approval from the NRC that would allow other utilities to order it off the shelf knowing that the plant design was pre-licensed and, therefore, not open to endless re-review in future license applications. This is a point that was elaborated on by Commissioner Bernthal, who, during the Senate hearing, cited changes to existing law that are necessary for the NRC to be able to grant generic pre-approvals to plants for use at multiple sites.

The second reason for legislation rests on the fact that the approval process for nuclear power plant construction needs to go far beyond design pre-approval. The vehicle for establishing that mechanism is the combined construction permit and operating license (COL) which only legislation can provide. Without the COL, therefore, both a utility and the NRC are left to taking ad hoc action on safety issues as construction goes along. This breeds the kind of uncertainty and regulatory instability that persists today. In short, only the COL provision of S. 2073 guarantees the standardization and stability of both the plant and the complex process by which it is built.

ANSWERS TO POST-HEARING QUESTIONS (cont'd.)

The third reason for legislation is that purely administrative reforms in the licensing and construction process, though laudable, would not by themselves give us the confidence we need for the long-term. Without legislative authority for complete and stable designs, as well as construction procedures, I fear that it would not be long before the utility industry found itself in the same situation that has prevailed for a decade: construction periods that have no predictable endings and no predictable costs.

2. A "standard" design is a functional design of either a complete nuclear power plant or a major portion (e.g., nuclear steam supply system or balance of plant) that has been pre-approved as a result of the licensing process and can be reproduced from site to site and from utility to utility essentially unchanged. Vendors and architects/engineers have indicated that as much as 100 percent of a nuclear steam supply system can be standardized as well as 90 percent of a balance of plant. The remainder of the balance of plant would be specific to the characteristics of a particular site.

3. There is no question that the licensing process envisioned in S. 2073 would enhance public participation in the nuclear power plant licensing process. This is obvious from just an examination of the number of hearings available under the legislation: one for design pre-approval; another for site pre-approval; another for the COL; and a process for obtaining a fourth hearing at the pre-operational phase of plant construction. Today's licensing system provides for only two hearings. The first of those is held on the basis of preliminary designs when a utility applies for a construction permit, and the last is held for a nearly-complete plant when a utility applies for an operating license. It is very clear that neither hearing is meaningful for the public because the first is held too early for substantive issues to be aired and the second is held after an investment of billions of dollars.

My observation of the process is nothing new. The Report of The President's Commission On the Accident At Three Mile Island (Kemeny Commission) came to exactly the same conclusion and offered the same remedy to the deficiencies of today's public involvement process as S. 2973: the NRC should have the authority to grant combined construction permits and operating licenses that settle every significant safety related design and construction issue before construction begins.

5/20/86

OFFICIAL COMMITTEE FILE
PLEASE RETURN

DUKE POWER COMPANY
ELECTRIC CENTER, P.O. BOX 33189, CHARLOTTE, N.C. 28242

R. B. PRIORY
VICE PRESIDENT
DESIGN ENGINEERING

(704) 373-5959

SENATE COMMITTEE ON
ENERGY AND NATURAL RESOURCES
RECEIVED
MAY 23 1986
WASHINGTON D.C. 20510

May 19, 1986

The Honorable James A. McClure
United States Senate
Committee on Energy and Natural Resources - Chairman
Washington, DC 20510

Dear Senator McClure:

Thank you for your letter of May 7, 1986 requesting responses to questions relative to Senate Bill S.2073, the "Nuclear Facility Standardization Act of 1986." For your use, I am attaching answers to the questions raised. Again, I urge your committee to move expeditiously to report a nuclear standardization and licensing bill. I believe S.2073 provides a solid framework for obtaining effective nuclear licensing reform.

Please let me know if you have additional questions or require additional input.

Very truly yours,

RBPriory

R. B. Priory

RBP/pam

Attachment

Q: Since standard designs are already available, at least of nuclear steam supply systems, why do we need legislation?

A: The objective of the proposed legislation is to enhance the viability of nuclear power as a generation option to meet our electricity needs for the future. Unfortunately, at this time, nuclear power is perceived by the utility industry and investment community as too economically risky an investment, too expensive, and requiring too much time to license and construct a plant to be considered a competitive generation alternative. A major contributor to this situation is the current licensing process which is both unstable and unpredictable. The proposed legislation, which will further enhance the implementation of standardization via the Design Certification (DC) and the Construction and Operating License (COL) processes, will allow nuclear power to effectively compete with other generation alternatives. I believe this will occur because an effective and efficient licensing process will contribute significantly to a reduction in the real cost of nuclear power. This reduction in cost will occur in two significant ways:

1. The cost of borrowed funds for utility will be reduced. This will happen because investors and lenders will perceive that once the DC and COL have been obtained, project progression will be stable and predictable and investment risk reduced substantially. Along with this perceived reduction of risk will be a real reduction in the cost of borrowed funds.

2. The time from initiation of construction to operation will be reduced. This will happen because the design will be essentially complete and regulatory requirements defined and stabilized prior to initiation of construction. This will result in minimum rework on the project, optimized designs, and enhanced construction management. The reduction in construction time will significantly reduce costs associated with escalation and finance charges for the project.

Legislation is necessary to establish a sound statutory framework for nuclear power plant standardization. Standardization, licensing stability and regulatory predictability must be tightly tied together by legislation to enable nuclear power to regain its economic viability as a future generating option. This legislation is an essential part of reducing the investment risks in future plants by offering a stable and predictable regulatory process. I do not believe that any other approach, short of legislation, will accomplish this objective.

Q: How would you define a "standardized design"? How much of a nuclear plant could be standardized?

A: In the context of the proposed legislation, "standardized design" means designs for an entire nuclear power plant, nuclear steam supply system (NSSS), balance of plant (BOP), and/or discrete subsystems which have been submitted to, and reviewed and approved by, the NRC. Such preapproved designs can then be relied upon by an owner to form the basis, or part of the basis for an application to construct and operate a nuclear plant. In my opinion, designs for standard plants in the future will be developed by consortiums made up utilities, NSSS vendors, turbine generator vendors, AEs, constructors, etc. Depending upon the parties involved in such a consortium, virtually all of the plant could be standardized. This, of course, would exclude site related information but could represent up to 90 percent of the total scope of design of the plant. As I indicated in my previous testimony, the Commission and applicant would determine the level of design detail necessary to support the making of requisite safety findings and to determine applicable tests, inspections, analyses, and acceptance criteria. Nameplate information to support this effort would not be available, however, the level of design detail would be sufficient to support equipment procurement.

Q: Is it true that the legislation would stifle, rather than enhance public participation in the licensing process?

A: It is not true that the legislation would stifle meaningful public participation in the licensing process. Additionally, there will be no lessening of opportunity for public partication as the legislation allows for a hearing at anytime it can be shown that new, relevant information is available. In fact, the legislation will enhance public participation in the process. The opportunity for public participation concerning the adequacy of plant design will be available during the design certification proceedings. Public participation will be more useful and able to explore technical issues to a greater depth than is now possible at the construction permit stage since the design will be essentially complete. Public participation regarding site related matters will occur at the COL stage. The legislation will allow the public to provide input at a stage when such participation is most meaningful, before commencement of construction is authorized and before the bulk of the financial investment in the facility has been expended.

OFFICIAL COMMITTEE FILE
PLEASE RETURN

DUKE POWER COMPANY
ELECTRIC CENTER, P.O. BOX 33189, CHARLOTTE, N.C. 28242

R. B. PRIORY
VICE PRESIDENT
DESIGN ENGINEERING

(704) 373-5959

SENATE COMMITTEE ON
ENERGY AND NATURAL RESOURCES
RECEIVED
MAY 27 1986
WASHINGTON, D.C. 20510

May 23, 1986

The Honorable James A. McClure
United States Senate
Committee on Energy and Natural Resources - Chairman
Washington, DC 20510

Dear Senator McClure:

Thank you for your letter of May 12, 1986 requesting responses to questions relative to Senate Bill S.2073, the "Nuclear Facility Standardization Act of 1986." For your use, I am attaching answers to the questions raised. Again, I urge your committee to move expeditiously to report a nuclear standardization and licensing bill. I believe S.2073 provides a solid framework for obtaining effective nuclear licensing reform.

Please let me know if you have additional questions or require additional input.

Very truly yours,

C C Rolfe for

R. B. Priory

RBP/pam

Attachment

Q: As one of the few autonomous power companies, Duke Power has capabilities in both design and construction of nuclear power plants. You have mentioned that Duke Power is operating 6 nuclear units with the 7th scheduled to come on line later this year. Certainly, you are in a unique position to develop in-house, some standard design. What are your experiences in standard design? Why can't you implement a standard design for your own nuclear units?

A: Duke Power Company is unique in the utility industry because of our experience in engineering, construction, and operation of nuclear units. We can speak from the perspective of not only a utility that operates nuclear power plants, but also the architect-engineer and the constructor.

Oconee Nuclear Station consists of three 860 megawatt Babcock & Wilcox units. McGuire Nuclear Station has two 1180 megawatt Westinghouse units. Catawba Nuclear Station has two 1145 megawatt Westinghouse units. The nuclear portions of the McGuire and Catawba units are essentially the same with a few exceptions directly related to site specifics. These nuclear generating units are standardized to the extent practical, considering the vintage and regulations governing each plant's design. Our excellent experiences with standardization led us to plan Project 81, which would have consisted of six identical Combustion Engineering units on two sites.

The last of the Project 81 units was cancelled in April 1983. Revised load forecasts and economic conditions indicated that additional generating capacity would not be needed until 1995. This situation eliminated the project's cost advantage over alternative types of generation.

The decision to add generating capacity of any kind is based on many factors, including such things as load forecasts, economic conditions, financing alternatives and regulatory considerations.

Standardization has been and can still be accomplished without licensing reform. Licensing reform will, however, reduce the risks associated with the investment of the large amounts of capital required for nuclear construction, enhance the cost advantages of standardization, and increase the likelihood of new nuclear orders when additional generation is needed.

Q: If utilities are involved in the development of standard plant design during the Design Certification stage, will they be locked in with a specific vendor in future plant consideration?

A: Designs for standard plants in the future will most likely be developed by consortia consisting of utilities, NSSS vendors, turbine generator vendors, Architect/Engineers, constructors, etc. The objective of each consortium will be to develop a standard design that will be utilized several times. Each consortium will invest a significant amount of design engineering work-hours before an application for a Design Certification is submitted to the NRC. This effort will result in a large expenditure of capital on the part of the consortium generating the standard plant design. In fact, I estimate these expenditures to be in the range of 150 to 200 million dollars.

The Design Certification process will permit standard designs to be developed by a number of consortia. A utility could select any standard plant for implementation. Extensive involvement by a utility in a particular Design Certification could make selection of an alternate standard plant economically unattractive for subsequent generation additions.

Q: In your testimony, you have listed documents, drawings, and information as part of a Design Certification. What documents, drawings, and information are not included or required in the Preliminary Safety Analysis Report (PSAR) currently required for a Construction Permit (CP)?

A: A standard design will be specifically developed to encompass a number of site specific variables and conditions. The design will feature performance-related "envelope" criteria such that the standard design could be implemented at a significant number of available sites in the U.S. Once a site is selected, the site specific conditions will be evaluated to ensure they fall within allowable envelope conditions. A design certification will then be coupled with the site specific engineering information and submitted to the NRC as an application for a Construction and Operating License (COL).
The application for a Design Certification will consist of a Plant Safety Report and supporting design documents and drawings required and necessary for NRC review.

1. Information contained in the Plant Safety Report

   A. Design Basis Criteria - The Plant Safety Report will identify the criteria upon which the design of the plant will be based. Included in this section will be references to the General Design Criteria (10CFR50 Appendix A), Standard Review Plan (NUREG 0800), and the codes and standards used in design, construction and operation (ASME, IEEE, etc.). Other regulatory requirements identified will include emergency plans, QA program, materials requirements, ALARA, ECCS evaluation, fire protection, security plan and technical specifications.

   B. Analysis and Design Methods - The Plant Safety Report will identify the engineering methods, assumptions, design guides, analytical approaches and computer codes to be used in the plant design. This will include methodologies for seismic design, pipe stress analysis, and fluid flow design. Additionally, load combinations will be identified.

   C. Functional Design and Physical Arrangement of Auxiliary, Balance of Plant, and Nuclear Steam Supply Systems - The Plant Safety Report will describe the major plant parameters and functional design requirements resulting from NSSS and T/G selection, and will reference appropriate preapproved vendor supplied documents. It will include listings of basic systems, structures and components, functional descriptions of buildings, major equipment layouts, and interface requirements identified by major vendors.

D. Plant Physical Arrangement Sufficient to Accommodate Systems and Components - The Plant Safety Report will contain the general arrangement information derived from the major plant parameters and functional design requirements. Other requirements such as component removal, pull space, maintenance, and personnel access are incorporated in general arrangement information development.

E. Functional/Performance Specifications for Components and Materials - The Plant Safety Report will contain design criteria specifications that will identify functional and performance requirements for systems and components in the balance of plant.

F. Acceptance/Test Requirements - The Plant Safety Report will identify applicable codes, standards, regulations and acceptance criteria to be used in construction, installation, and testing.

G. Probabilistic Risk Assessment Methodology - The Plant Safety Report will identify the methodologies, assumptions, and procedures to be used in the performance of the plant design probablistic risk assessment.

Items A, B, C, and D above are similar to information currently required for a PSAR . Items E, F, and G above are not currently required for a PSAR.

2. Initial issues of the following design documents and drawings will have been completed to support review of the Plant Safety Report.

A. Design Basis Criteria - This information will be addressed in General Design Criteria Specifications and Functional Design Criteria Specifications.

B. Plant General Arrangements of Structures and Components - Spatial orientation of walls, floors, buildings, and the equipment and systems within these structures will be identified on General Arrangement drawings.

C. Process and Instrumentation Diagrams - Direction of fluid flow, process information, and the components that are part of the plant systems will be identified on P&IDs.

D. Control Logic Diagrams - Reactor protection, engineering safety features, and the balance of plant will be identified on Control-Logic Diagrams.

E. System Functional Descriptions - System purpose, function, and operational requirements will be identified in System Functional Descriptions.

F. Component and Procurement Specifications including Acceptance Test Requirements - Equipment and material performance requirements will be identified on component and procurement specifications. Additionally, these specifications will include procurement information and the requisite codes and standards to which the materials and components shall be tested.

G. Construction and Installation Specifications - These specifications will identify the criteria and methods by which systems, structures and components are erected or installed in the facility. These specifications will include acceptance, inspection, and testing requirements and criteria.

H. QA Program - A QA program will be identified which assures conformance of the design, construction, and operation of the facility to applicable regulatory standards such as 10CFR50 Appendix B, approved industry standards such as ANSI, and corresponding daughter standards or equivalent alternatives. The program includes the surveillance and inspection of design, construction, and operation of the facility.

I. Emergency Plans - These plans will identify actions to be followed in the event of a plant malfunction including both onsite and offsite evacuations.

NOTE: Supporting Design Documentation such as bounding site data and calculations sufficient to support the above level of design detail - Requirements for systems, structures or components associated with the bounding site will be identified. Typical information necessary to establish these requirements includes meteorology, geology, hydrology, subsurface and foundations, seismology, flood studies, and auxiliary sources of nuclear service water.

J. Security Plan - This plan will identify provisions for the physical protection of the plant consistent with the requirements of 10CFR73. The plan will address the use of guards, watchmen, physical barriers, and visual surveillance such that sabotage, theft or diversion of nuclear material does not occur.

K. ALARA/Radiation Protection Plan - A program will be identified to protect employees form radiation exposure and to keep employee doses as low as reasonably achievable while the plant is being constructed, operated, and modified.

L. Accident Analysis - A deterministic examination of undesirable events will be performed to determine the necessary response if such events should occur. This analysis will consider occurrences classified as operational transients, faults of moderate frequency, infrequent faults, and limiting faults.

M. Draft Technical Specifications - These specifications will provide a description of plant operation with respect to safety limits and limiting safety system settings, limiting conditions for operation, surveillance requirements, design features, administrative controls, and definitions. The process of formulating draft technical specifications will involve obtaining standard technical specifications from the NRC and determining which specifications are applicable, which need modification, provision of applicable values of parameters and variables, figures, graphs, and other information required to complete the standard technical specifications.

N. Probabilistic Risk Assessment - A systematic and structured methodology will be applied to obtain quantitative estimates of the risks of various malfunctions through the use of accepted probabilistic and statistical techniques and consequence evaluation methods. Due to its comprehensive and systematic nature, PRA methodology is a powerful tool for estimating the impact of design alternatives on a plant's margin of safety.

Under the current licensing process these design documents and drawings have generally not been available at the time of PSAR submittal. The level of design detail given in the Plant Safety Report and supporting documentation is a significantly greater quantity and better quality of information than would be submitted in a PSAR.

Q: What portion of the cost of nuclear power plants is for designing? What would be the cost for designing a nuclear plant if we have one-step licensing procedure in place?

A: On the McGuire and Catawba nuclear stations, Duke Design Engineering Department costs were 10% and 9% of the total project costs, respectively.

The design cost of the generic (first) standard plant will not be significantly different from plants designed in the past. The major saving in design cost will be due to amortizing the cost over several new generating facilities. The French have been able to utilize a single design for as many as ten facilities. Our experience with standard design of coal-fired cogeneration units of 35 MW size has been design savings in the range of 85-90%. In my opinion, one-step licensing will enhance the cost savings inherently associated with standard plant design.

Q: Two significant benefits for licensing reform are cost reduction and time reduction in construction. Would you elaborate on the amount of cost and time that can be saved?

A: Consider the French experience with standardization. Construction of the first units of the 900 megawatt series took between seventy-five and eighty months from NSSS commitment to connection to the grid. For subsequent units, construction time was reduced to between sixty and sixty-five months. The time between fuel loading and commercial operation was also shortened.

With a design certification, one-step licensing, and a significantly improved construction process, it is not unrealistic to expect that a single U.S. nuclear unit could be built on a seventy-two month schedule from COL to plant demonstration warranty run. An improved construction process will feature the following:

- Improved construction plan and schedule
- Enhanced design/construction integration program
- Utilization of advanced construction techniques and practices
- Plant features that facilitate construction, installation, removal and testing
- Improved program for system completion, start-up testing and owner acceptance.

Experiences based on our McGuire and Catawba Nuclear Plants show AFUDC costs to be 33 and 35 percent of the total project costs, respectively. Approximately fifty percent of these costs occurred in the last three years of the projects. Assuming a one-step licensing process had been in place and shortened project schedules had been achieved on these plants, cost savings of between fifteen and twenty percent of each project's costs could have been realized.

OFFICIAL COMMITTEE FILE
PLEASE RETURN

Bechtel Power Corporation
Engineers—Constructors

Fifty Beale Street
San Francisco, California
Mail Address: P.O. Box 3965, San Francisco, CA 94119

May 23, 1986

SENATE COMMITTEE ON
ENERGY AND NATURAL RESOURCES
RECEIVED
MAY 27 1986
WASHINGTON, D.C. 20510

Hon. James A. McClure
Chairman, Committee on Energy and Natural Resources
United States Senate
Washington, DC. 20510

Dear Senator McClure:

You ~~asked for my written~~ response to several questions relating to my April 22, 1986 testimony before the Senate Committee on Energy and Natural Resources, on Senate bill S. 2073 "Nuclear Facility Standardization Act of 1986."

I have the following response to your first question -- will legislation like S. 2073 help Bechtel because it is better to have a reduced scope of engineering work than have no work at all?

Bechtel has been providing professional services to the commercial nuclear power industry since its inception more than 30 years ago. We hope to continue to serve that industry for at least another 30 years, so you might say our interest in nuclear power is long term.

Until quite recently, this nation's nuclear power technology was experiencing extensive and continuous change. Our technology was acknowledged to be state-of-the-art, and it was copied throughout the noncommunist world. Our plants grew rapidly in size and complexity in response to the evolving needs of the nuclear utilities and ever changing regulatory requirements, spurred on by competitive pressures inherent in the U.S. free enterprise system. Customized design was an inevitable accompaniment to swift technological advancement.

The situation is different today. The current generation of nuclear power plants has achieved levels of size and sophistication which for the foreseeable future, represent practical limits dictated by present needs and the nation's available technological and financial resources. These are good designs and good plants. They are very safe and would be cost effective except for unnecessary schedule delays resulting from licensing impediments and duplicative procedures. Some measure of standardization has been achieved as well -- the SNUPS and Palo Verde units, recently completed, attest to that.

In my opinion, both the technology and the industry have reached a stage of maturity where standardization has become a natural and essential element in the competitive economic process. Standardization is no longer a question of what will help Bechtel or any other architect-engineer, but rather what the market place demands of the entire industry.

Standardization is only possible through new legislation. In our view, the only remaining question is how best to achieve safe and cost effective standardization. We believe the answer lies in replication of commercial units with proven current operating experience.

You also enquired as to what sort of lead times and costs Bechtel has typically delivered abroad (Korea and Taiwan), compared to the U.S., and how we account for that in terms of the regulatory and licensing environments of other countries that have successfully deployed American nuclear technology.

It is a fact that the nuclear power plant projects recently completed or nearing completion in Korea and Taiwan have significantly shorter construction schedules than have U.S. plants. The average schedule durations for each of the four KNU units (Nos. 5-8) in South Korea and Maanshan Units 1 & 2 are approximately as follows:

Start Engineering to First Concrete	19 mos.
First Concrete to Fuel Load	64 mos.
Fuel Load to Commercial Operation	7 mos.
Total	90 mos.

By comparison, recent schedules for U.S. nuclear power stations range from 120 to 140 months and, of course, several have been much longer. The critical interval from first concrete to fuel load has often been twice the five years required abroad.

While there are a number of contributing factors, a primary reason is the cumbersome, frequently adversarial, relationship between the NRC and the utilities being regulated. We do not see that kind of relationship overseas. The licensing process is far more stable and predictable. Once the permit to construct is granted, regulatory practice does not allow continuing design changes and day-to-day retrofit or rework of completed portions of the plant. Only the raising of a major, new and genuine safety concern might justify a quick and complete review of a particular plant system or facility.

In a capital intensive project such as a nuclear generating station, cost tends to correlate closely with construction time. Doubling the basic 60 months construction period has caused cost increases of more than 50%, just for additional financing and increased exposure to inflation induced escalation. Compounding this increase with the manhour and material costs of rework due to changing licensing requirements, and delays resulting from unnecessary reinspections, often have doubled the price of U.S. plants.

Schedule and related cost overruns are a key area for improvement in the U.S. Given a reasonable regulatory environment, with licensing reform, we can return the cost of nuclear power generating facilities to the clearly competitive position they enjoyed here during the early 1970s, in comparison to fossil fueled plants, and which they continue to enjoy over much of the rest of the world.

You had asked three additional questions earlier, regarding my April 22 testimony.

1. Since standard designs are already available, at least of nuclear steam supply systems, why do we need legislation?

   While it is true that NRC rules allow for the development and use of standard designs, there are two very important reasons why legislation is still required.

   a. A major component of S. 2073 and all other licensing reform bills, is a provision for a combined construction permit and operating license (COL), verified by on-site inspection and final approval by the NRC of construction, in a stepwise and timely manner. A COL cannot be established through NRC rule making but only through legislation. The COL is the driving force for the industry to pursue standardized nuclear power plant designs.

   b. It is estimated that the design detail necessary to justify a COL will require the expenditure of 150 to 200 million dollars. It is highly unlikely that manufacturers and architect-engineers would be willing to commit these financial resources solely on the basis of NRC rule making, which is subject to change. Legislation is required to assure predictability.

2. How would you define a "standardized design"? How much of a nuclear plant can be standardized?

   A standard design is a design of either a complete nuclear power plant or a major portion (e.g. nuclear steam supply system or balance of plant) that has been pre-approved by the NRC and can be replicated from utility to utility while meeting all safety requirements. Setting aside site specific aspects of a plant design such as cooling water intake and discharge, we estimate 90% of a plant design can be standardized down to the level of component and equipment specifications. In fact, it is possible to standardize for seismic requirements over a range of possible sites in the United States.

3. Is it true that legislation would stifle, rather than enhance public participation in the licensing process?

   Quite the reverse is true. Misnamed a "one-step" licensing bill because of its COL provision, S. 2073 actually provides more public participation in the nuclear power plant licensing process, than is available today.

   First, the pre-licensing of a standard plant design requires a public hearing under S.2073. In addition, the legislation also provides for the approval of sites involving public participation, independent of whether or not the utility applies for a COL.

Finally, the NRC can grant a pre-operational public hearing on the basis that a nuclear plant "has not been constructed or will not operate in conformity with the license". Intervenors would have to present new information "that was not and could not have been considered in a prior proceeding".

A threshold certainly exists at this point, however, we believe this provides for fairness and order. When the opportunity for public involvement in the licensing process afforded by S. 2073 are counted up, the difference is quite clear. The public wins in S. 2073.

I hope the above responses to your questions will be useful in clarifying the record of my April 22 testimony. Please do not hesitate to contact me again if I may be of service to you or the Committee.

Sincerely,

Howard B. Friend
Vice President

HBF bH

OFFICIAL COMMITTEE FILE
PLEASE RETURN

CP&L
Carolina Power & Light Company
P. O. Box 1551 • Raleigh, N. C. 27602
(919) [illegible]

SHERWOOD H. SMITH, JR.
Chairman/President

SENATE COMMITTEE ON
ENERGY AND NATURAL RESOURCES
RECEIVED
MAY 21 1986
WASHINGTON, D.C. 20510

May [illegible], 1986

Honorable James A. McClure
United States Senator
Washington, D. C. 20510

Dear Senator McClure:

Attached are answers to the questions from the United States Senate Committee on Energy and Natural Resources concerning the Hearing on S. 2073, "Nuclear Facility Standardization Act of 1986."

Please let us know if additional information is needed.

Sincerely,

Sherwood

Sherwood H. Smith, Jr.

SHSjr:bas

SHERWOOD H. SMITH
ANSWERS TO QUESTIONS FROM
UNITED STATES SENATE
COMMITTEE ON ENERGY AND NATURAL RESOURCES
HEARING ON S. 2073
"NUCLEAR FACILITY STANDARDIZATION ACT OF 1986"
APRIL 22, 1986

1. Since standard designs are already available, at least of nuclear steam supply systems, why do we need legislation?

Legislation is needed to update the basic nuclear licensing approach currently being used by the NRC that dates back to the mid-fifties, thirty years ago. Two important aspects of the needed legislative direction are the approach to encourage the use of standard plant designs and the one-step licensing that should accompany such use. Even though standard designs are available, the current NRC process does not permit approval of an existing standard design for a new plant without performing a complete design review. Legislation is needed to provide basic guidance to the NRC to permit it to approve a standard design for a reasonable period of time without the need to re-evaluate the design when it is referenced by a utility. This pre-approval of an essentially complete standard design in conjunction with a combined Construction and Operating License (COL) must be addressed legislatively to provide the assurance that NRC will achieve an efficient and effective licensing approach.

The Congressional direction in the form of legislation is needed to support the concept of standardization. The task of development of the specific technical details for implementation of standardization is appropriately in the regulatory arena. The nuclear industry stands ready to work with the NRC on that task.

2. How would you define a "standardized design"? How much of a nuclear plant can be standardized?

The nuclear industry, working through the Atomic Industrial Forum Study Group on the Practical Application of Standardized Nuclear Power Plants in the United States, has developed a comprehensive Position Paper on Standardization. That document was attached to the testimony of Mr. Richard Priory presented during the April 22, 1986 hearing. It goes into detail in defining standardization and the degree of standardization that is appropriate, including standardized nuclear steam supply system (NSSS) and balance of plant (BOP) designs.

Basically, a "standardized design" is one that involves an essentially complete design in sufficient detail to permit the NRC to evaluate all relevant safety aspects and features of the design. All nuclear systems would have essentially complete designs and the balance-of-plant would have about eighty to ninety percent design completion when the COL would be issued.

3. Is it true that the legislation would stifle, rather than enhance public participation in the licensing process?

No, the proposed legislation would not stifle public participation. One complaint about the present system voiced by the intervenors is that their participation is limited and is "too little, too late". The proposed legislation would enhance the public participation by allowing the public full access and review of essentially complete design of the safety systems and most of the balance-of-plant before the COL would be issued. This early access is not provided with the present licensing process because the designs are not sufficiently complete at the construction permit hearing stage. The public will be permitted participation at the design certification stage, as well as the COL stage, with much greater detail of information available at the time of the early public hearing.

COMBUSTION ENGINEERING

Shelby T. Brewer
Senior Vice President
Nuclear Power Systems

May 20, 1986

The Honorable James A. McClure
Chairman, Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Senator McClure:

I am pleased to provide the attached responses to the questions posed in your letter of May 7, 1986, regarding S.2073, the "Nuclear Standardization Act of 1986." Combustion Engineering remains committed to the support of licensing reform legislation and is encouraged by the continued leadership role of the Committee on Energy and Natural Resources.

If I can be of further assistance, please let me know.

Respectfully,

Shelby T. Brewer

STB:bkm
Attachment

Power Systems
Combustion Engineering, Inc.

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

(203) 688-1911

QUESTION 1

1. Since standard designs are already available, at least of nuclear steam supply systems, why do we need legislation?

RESPONSE

1. Utilizing even the most conservative load growth projections, the U.S. will need new generating capacity in the 1990's. Without nuclear licensing and regulatory reform legislation, however, it is unlikely that the utilities and the financial community will step up again and place major long term investments at risk. Absent reform legislation, nuclear power will not be available as an option for new generating capacity. We cannot afford to dispense with an energy source which has clearly demonstrated its dependability, cost-effectiveness and safety simply because of the failure to reform our institutional processes.

   The present capacity buys us time to modernize the nuclear regulatory system, free from pressures and acrimonies. There is some time for each of the parties -- the utilities, their suppliers, the financial community, the public, the regulators and the Congress -- to take stock, to define their respective responsibilities and their respective requirements, and to design a regulatory process which serves all of this nation's interests.

   Legislation is needed to consolidate the current concensus among the equipment vendors, the utilities, and the NRC that standardization - true standardization of product and process - will go a long way toward curing our ills. It is needed to codify the framework for future licensing processes in such a way that a utility is assured, before construction begins, that if it uses a pre-approved design on a pre-approved site, it will be allowed to operate the plant. The combined construction permit and operating license (COL) provisions in the proposed legislation will accomplish this.

QUESTION 2

2. How would you define a "standardized design"? How much of a nuclear plant can be standardized?

RESPONSE

2. A "standard design" is a plant design (or major system design, such as the nuclear steam supply system) that can be reproduced - essentially unchanged - from site to site, utility to utility, and meet all requirements. In terms of the licensing process a standard design would include that portion of the design necessary for the NRC to complete its safety reviews and pre-approve the design for construction and operation at multiple sites. In practice this would mean standardization of the entire nuclear steam supply

system (including all safety systems) and major support systems in the balance-of-plant design. Because of the economic benefits of standardization it would probably be extended to include nearly all of the balance-of-plant design, even including systems not related to safety. Approximately 90% of the plant design could be standardized, with the remaining portion reflecting site-specific differences.

In order to benefit, to the maximum extent possible, from favorable foreign experience with standardization -- and yet retain the advantages and improvements that come with a competitive economy -- some flexibility in the non-safety related portions of the design should be maintained. Since the nuclear portion of the plant generates and contains the radioactive material, it rightfully commands the most regulatory attention. As a result, the nuclear scope needs to be the most standardized. Its pre-approval is, therefore, key to closing out each significant safety issue.

The process we envision for standardized plants would allow for "certification" and "banking" of nuclear and balance-of-plant designs, as well as sites. The NRC would not issue a combined Construction/Operating License (COL), of course, until a whole plant and site had been presented for its approval. Use of a certified (or pre-approved) system or site would simply eliminate the need for agency re-review prior to the issuance of the COL.

QUESTION 3

3. Is it true that the legislation would stifle, rather than enhance public participation in the licensing process?

RESPONSE

3. The proposed legislation enhances public participation by making it more meaningful. The opportunity for public hearings is included in each significant process: pre-approval of designs, early site approval, and combined construction and operating license applications. Futhermore, complete design information will be available for public scrutiny and comment prior to any hearings and prior to the start of construction. This is in clear contrast to the current system where the first opportunity for public hearings (construction permits) must be based on preliminary and incomplete designs and the final opportunity for public participation (at the operating license stage) is set in the context of massive sunk investment by the utility. It is necessary and desirable that the public have an opportunity to express their concerns and to have them addressed. The public's participation is most effective when complete information is in hand and when design changes can be made to rectify legitimate concerns without a substantial schedular and cost impact on plant construction. Clearly, the early participation by the public and resolution of all issues prior to construction is in the interest of not only the public, but of the utilities and their customers.

OFFICIAL COMMITTEE FILE
PLEASE RETURN

Westinghouse
Electric Corporation

1801 K Street N W
Washington DC 20006

SENATE COMMITTEE ON
ENERGY AND NATURAL RESOURCES
RECEIVED
MAY 23 1986
WASHINGTON, D.C. 20510

May 21, 1986

The Honorable James A. McClure
Chairman, Committee on Energy and Natural Resources
United States Senate
358 Senate Dirksen Office Building
Washington, D.C. 20510

Dear Mr. Chairman:

On behalf of Mr. James S. Moore, Vice President and General Manager, Power Systems Business Unit, Westinghouse Electric Corporation, I am pleased to provide the following responses to the questions attached to your letter to Mr. Moore dated May 7, 1986, concerning S.2073, the "Nuclear Facility Standardization Act of 1986."

Question 1.

Since standard designs are already available, at least of nuclear steam supply systems, why do we need legislation?

Answer:

The proposed legislation will provide much needed certainty and stability in the regulatory process and will create important incentives for the development of nuclear power plant designs. The key to providing the certainty and stability now sadly lacking in the licensing process is discipline. Legislation is needed to foster this discipline. Although the Commission has been attempting to modify and improve the licensing process without legislation to encourage standardized designs, experience indicates these efforts will not be successful without the support of legislation.

The standard designs that are available today for the nuclear steam supply systems require for their use a stable regulatory environment. Thus the industry needs a firm base of Congressional action to create such an environment to enable utility and other industry decisionmakers to make appropriate and forward thinking investment decisions.

Although we currently have standardized nuclear steam supply system designs, these designs are not preapproved for use from site to site or utility to utility. Further, there needs to be standardized preapproved designs not only for the nuclear steam supply systems, but for all safety related aspects of a plant, including the balance of plant. Without such preapproval and without a provision for use of such preapproved designs in a combined construction permit/operating license, no utility will be able to make the necessary investment in a nuclear power plant, since there would be no reasonable assurance that a plant, once constructed, would be allowed to operate.

Moreover, action by the Congress to provide the needed reforms in the regulatory process will be a strong signal to the international nuclear community that the United States intends to continue to be a reliable supplier of nuclear power plants and associated equipment and services, and to continue its technological and regulatory leadership in nuclear power.

Question 2.
How would you define a "standardized design"? How much of a nuclear plant can be standardized?

Answer:
A "standardized design" is a design of either a complete nuclear power plant or a major portion (e.g., nuclear steam supply system or balance-of-plant) that has been preapproved by the Nuclear Regulatory Commission and can be reproduced from site to site and from utility to utility while meeting all safety standards.

Nuclear equipment manufacturers can standardize 100 percent of a nuclear steam supply system; and 90 percent of the balance-of-plant can be standardized and remained fixed regardless of differences among sites.

Question 3.
Is it true that the legislation would stifle, rather than enhance, public participation in the licensing process?

Answer:
No. In my view, the proposed licensing reform legislation would provide a greater opportunity for public participation in the nuclear licensing process than is the case today. Perhaps more important, by increasing the amount of design detail necessary to obtain a certified design approval and

> a combined CP/OL the licensing reform bills would enhance the opportunity for the public to make a meaningful contribution to the licensing process, and thus would enhance the quality of public participation.
>
> There are two significant reasons why the proposed legislation would enhance public participation. First, the public would have more opportunities for hearing; and second, the opportunities afforded the public will come at a more meaningful time in the licensing process. Under the proposed legislation, there will be opportunity for public participation at four points in the licensing process. Initially, public participation occurs in connection with consideration of the design approval. Second, a site approval only can be issued following an opportunity for public hearing. Third, the Commission will be permitted to issue a combined CP/OL, but again only after opportunity for public hearing. Thus, before construction of a standardized or preapproved plant can even begin, there will have been three distinct opportunities for the public to participate in the hearing process. Finally, near the conclusion of construction, there would be opportunity of public hearing upon a showing of good cause.

Thank you for the opportunity to participate in the hearings and to provide these additional views on this important topic.

Sincerely,

Leo Wright

F. Leo Wright
Vice President
Government Programs

FLW:mlk

OFFICIAL COMMITTEE FI
PLEASE RETURN

GENERAL ELECTRIC
GENERAL ELECTRIC COMPANY
NUCLEAR TECHNOLOGIES AND FUEL DIVISION
175 CURTNER AVENUE
SAN JOSE, CALIFORNIA 95125

DANIEL R WILKINS, GENERAL MANAGER
ADVANCED BOILING WATER REACTOR PROGRAM

SENATE COMMITTEE ON
ENERGY AND NATURAL RESOURCES
RECEIVED
MAY 27 1986
WASHINGTON, D.C. 20510

May 20, 1986

Honorable Senator James McClure
Capital, WDC 20510

MAY 23 1986

Dear Senator McClure:

Thank you again for the opportunity to participate in the Senate Committee on Energy and Natural Resources proceedings on Senate Bill S.2073, the "Nuclear Facility Standardization Act of 1986."

I have enclosed my response to the questions presented in your May 7, 1986 letter. If you would like more information, please feel free to contact me.

Sincerely,

DRWilkins

D. R. Wilkins

Attachment

ATTACHMENT
RESPONSE TO QUESTIONS ASKED BY SENATOR MCCLURE

QUESTION #1

Since standard designs are already available, at least of nuclear steam supply systems, why do we need legislation?

ANSWER

Legislation is needed to stabilize the licensing process of which standardization is an integral part.

GE believes that standardization offers the single most important contribution that can be made to a more effective licensing and regulatory process and to the assurance of a high level of safety for future nuclear power plants. There are five important reasons why this is so and why standardization deserves to be affirmatively supported by the Congress.

- First, standardization will provide the predictability which is essential to making the multi-billion dollar decision to invest in a nuclear plant;
- Second, standardization will lead to a better allocation of industry and regulatory safety resources;
- Third, standardization will improve the quality of NRC licensing and regulatory decisions;
- Fourth, standardization will substantially reduce the costs of constructing and licensing new nuclear units; and
- Fifth, the pre-approval process, which is an integral aspect of standardization, will enhance both the timeliness and effectiveness of public participation in the licensing process.

QUESTION #2

How would you define a "standardized design"? How much of a nuclear plant can be standardized?

ANSWER

The General Electric Company believes that design standardization is the keystone of a sound nuclear power program and of meaningful licensing reform.

By "standard design", we mean a design of either a complete nuclear power plant or a major portion (e.g., nuclear steam supply system or balance-of-plant) that has been pre-approved by the NRC and can be used for multiple units at multiple sites while meeting all NRC safety standards. Such a design -- which could be developed by a nuclear plant supplier, an architect-engineer, or a design team including both -- would be an essentially complete and final design for all parts of the nuclear plant systems important to radiological safety. An application for a standardized design approval would contain all of the information necessary for the NRC to determine that a plant using the design will operate safely.

QUESTION #3

Is it true that the legislation would stifle, rather than enhance public participation in the licensing process?

ANSWER

Design standardization will permit more effective public participation by affording the affected public an opportunity to have its questions considered earlier in the process — prior to any major utility commitment to a plant employing the design. Moreover, the public would be better informed because the hearing would be held with respect to an essentially complete design, which would provide a greater information base.

NAM
National Association
of Manufacturers

H. RICHARD SEIBERT, Jr.
Vice President
Resources and Technology Department

May 21, 1986

The Honorable James A. McClure
United States Senate
Chairman,
Energy and Natural Resources Committee
Dirksen Senate Office Building
Room 358
Washington, D.C. 20510

Dear Mr. Chairman:

This is in response to your May 7 letter requesting answers to questions on S. 2073, the "Nuclear Facility Standardization Act of 1986" for the April 22 hearing record.

Please find attached NAM's responses to your three questions on nuclear plant standardization and licensing reform. We appreciate the opportunity to supplement our oral statement before the committee.

If NAM can be of assistance in any way, please do not hesitate to contact me.

Sincerely,

Rich Seibert

1776 F Street, N.W.
Washington, D.C. 20006
(202)637-3000

1. Since standard designs are already available, at least of nuclear steam supply systems, why do we need legislation?

While it is true that NRC rules allow for the development and use of standard designs, there are two very important reasons why legislation is still required.

a. A major component of S. 2073 and all other licensing reform bills, is a provision for a combined construction permit and operating license (COL) verified by on-site inspection and final approval by the NRC of construction in a stepwise and timely manner. A COL cannot be established through NRC rulemaking but only through legislation. The COL is the driving force for the industry to pursue standardized nuclear power plant designs.

b. It is estimated that the design detail necessary to justify a COL will require the expenditure of 150-to-200 million dollars. It is highly unlikely that manufacturers and architect engineers would be willing to commit these financial resources solely on the basis of NRC rulemaking, which is subject to change. Legislation is required to assure predictability.

2. How would you define a "standardized design"? How much of a nuclear plant can be standardized?

A standard design is a design of either a complete nuclear power plant or a major portion (e.g. nuclear steam supply system or balance of plant) that has been pre-approved by the NRC and can be replicated from utility-to-utility while meeting all safety requirements. Setting aside site specific aspects of a plant design such as cooling water intake and discharge, we estimate 90 percent of a plant design can be standardized down to the level of component and equipment specifications. In fact, it is possible to standardize for seismic requirements over a range of possible sites in the United States.

3. Is it true that legislation would stifle, rather than enhance public participation in the licensing process?

Quite the reverse is true. Misnamed a "one step" licensing bill because of its COL provision, S. 2073 actually provides for more public participation in the nuclear power plant licensing process than is available today.

First, the prelicensing of a standard plant design requires a public hearing under S. 2073. In addition, the legislation also provides for the approval of sites involving public participation, independent of whether or not the utility applies for a COL.

Finally, the NRC can grant a pre-operational public hearing on the basis that a nuclear plant "has not been constructed or will not operate in conformity with the license." Intervenors would have to present new information "that was not and could not have been considered in a prior proceeding."

When the opportunities for public involvement in the licensing process afforded by S. 2073 are counted up, the difference is quite clear. The public wins with S. 2073.

OFFICIAL COMMITTE
PLEASE RET

ELECTRICITY
CONSUMERS
RESOURCE
COUNCIL

ELCON
1707 H Street, NW, Suite 1050
Washington, DC 20006
202-466-4686

John A. Anderson
Executive Director

May 20, 1986

SENATE COMMITTEE ON
ENERGY AND NATURAL RESOURCES
RECEIVED
MAY 23 1986
WASHINGTON D.C. 20510

The Honorable James A. McClure
Chairman
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Chairman McClure:

You recently requested written responses to questions as follow-up to the April 22, 1986, hearing on S.2073.

At the outset, I would like to again thank you for the opportunity to present the views of large industrial electricity consumers regarding nuclear licensing reform. As we said in our testimony, we are not technical experts on the construction of nuclear power stations. We are, however, large consumers of electricity and thus very interested in assuring an adequate and reliable supply of electricity at reasonable cost.

Our members observe that nuclear generating stations operate well in the United States. They also know that various foreign countries are able to construct nuclear generators that equal or exceed U.S. construction and operating safety standards in very short time periods and thus at much lower costs relative to comparable periods and costs in the U.S.

We believe that the nuclear option should not be foreclosed for reasons over which we have control. Nuclear licensing reform will help re-establish this option and thus should be carefully considered.

Specifically you ask:

1. Since standard designs are already available, at least of nuclear steam supply systems, why do we need legislation?

   For whatever combination of legal, policy and politcal reasons, the NRC has not exercised what current authority it has to approve standardized designs. Explicit legislative authority, such as that contained in S.2073, would make clear the NRC's authority to do so, and clear the way for appropriate regulatory implementation.

2. How would you define "standardized design"? How much of a nuclear plant can be standardized?

   ELCON does not have the technical expertise to define "standardized design." However, we support the approach contained in S. 2073, with the stautory criteria to be implemented in a public rulemaking, where all interested parties may participate.

3. It is true that the legislation would stifle, rather than enhance, public participation in the licensing process?

   This depends upon how the legislation is written. ELCON does not want to stifle public participation. We do want to suppress unnecessary, duplicative, redundant procedures. A process should be established that encourages resolution of issues in other than adjudicatory hearings. Written statements from all parties first should be presented to and evaluated by the NRC. Oral presentations should be allowed but not mandated. Adjudicatory hearings should be utilized only when it has been demonstrated that less formal proceedings cannot resolve substantial disagreements regarding basic public health and safety issues. Public hearings should not be held unless requested by either intervenors or the NRC. Issues once resolved should not be reheard unless substantial new material facts are introduced.

Thank you for the opportunity to offer these additional comments.

Sincerely,

John A. Anderson
Executive Director

FACT SHEET

ELCON

ORGANIZED: January 15, 1976

STRUCTURE: Association of industrial users of electricity

PURPOSE: Promote the development and adoption of coordinated, rational and consistent federal, state and local policies which will assure an adequate, reliable and efficient electricity supply for all users at prices based on the costs incurred in serving customers.

FUNDAMENTAL PRINCIPALS:

- Electric utility rates should be based on the cost of service;
- Adequate short term reliability and long term availability of electricity must be assured;
- Continuing, adequate and reasonably priced fuel sources for generating electricity are important for economic viability, development and growth;
- Electric utility costs should reflect efficient and well-managed utility operations;
- Electric utilities should have the opportunity to earn a fair rate of return in order to be able to meet current and future capital needs; and
- Federal and state regulatory processes should be responsible and timely.

ACTIVITIES:

- Represent industrial viewpoints in a constructive dialogue among all electricity users, suppliers, regulators, state and federal government bodies in a factual, objective manner;
- Promote awareness of why electricity costs have increased and possible ways to contain costs;
- Build an objective data base which identifies current and anticipated electricity problems and suggests practical solutions to these problems.

CURRENT MEMBERSHIPS:

Air Products and Chemicals, Inc. (Allentown, PA)
Anheuser-Busch Companies, Inc. (St. Louis, MO)
Armco (Middletown, OH)
Bethlehem Steel Corporation (Bethlehem, PA)
Cone Mills Corporation (Greensboro, NC)
Corning Glass Works (Corning, NY)
Diamond Shamrock Chemicals Company (Irving, TX)
Dow Chemical U.S.A. (Midland, MI)
E.I. du Pont de Nemours & Company (Wilmington, DE)
FMC Corporation (Chicago, IL)
General Motors Corporation (Detroit, MI)
Hercules Incorporated (Wilmington, DE)
Hershey Foods Corporation (Hershey, PA)
Kaiser Aluminum & Chemical Corporation (Oakland, CA)
Olin Corporation (Stamford, CT)
Owens-Corning Fiberglas Corporation (Toledo, OH)
PPG Industries, Inc. (Pittsburgh, PA)
A.E. Staley Manufacturing Company (Decatur, IL)
Stauffer Chemical Company (Westport, CT)
Union Carbide Corporation (Danbury, CT)

ELECTRICITY CONSUMERS RESOURCE COUNCIL
1707 H Street, N.W., 10th Floor, Washington, DC 20006
(202) 466-4686